



**NUMS**  
NATIONAL UNIVERSITY  
OF MEDICAL SCIENCES



**Past Paper MCQs of**

**NMDCAT**

**NUMS**

**FMDC**

**MDCAT**

**FEDERAL**

**90%**  
MCQs in  
2020 PAPER

*Ali Series*  
2021 Edition

# **NUMS & National MDCAT IN MY POCKET WITH VIDEO SOLUTION**



*Ali Sudais*

NMDCAT Instructor,  
Author & Motivational  
Speaker

- ★ NMDCAT Papers (2020 with full Explanation)
- ★ NUMS (2008 - 2020)
- ★ Vocabulary of PMC Wordlist  
(Urdu Meanings, Synonyms, Antonyms)
- ★ MDCAT (2008-2020) Subjectwise/Chapterwise/topicwise
- ★ FMDC Past papers
- ★ Federal Book MCQs
- ★ NUMS Subject wise MCQs

**1<sup>st</sup> Time in Pakistan**

**According to NEW PMC Syllabus**

**S ACA - STANDARD & ALI COACHING ACADEMY**  
ONLINE AND PHYSICAL

Order at App: Ali Series

# NUMS - NMDCAT

NATIONAL UNIVERSITY  
OF MEDICAL SCIENCES

## NMDCAT - SAMPLE PAPER

NAME: \_\_\_\_\_

ROLL NO: \_\_\_\_\_

CNIC: \_\_\_\_\_

### INSTRUCTIONS:

- Number of Multiple Choice Questions (MCQs): **200** Time Allowed: 2 Hours 30 Minutes
- Each MCQ shall carry 1 (One) mark with No Negative Marking.
- Each MCQ has 4 (Four) options. Select the most appropriate (one best) option.
- Fill the correct bubble on the answer sheet, corresponding to the question paper code.
- Answering with more than one option will not be considered for marking.
- Avoid cutting, overwriting and erasing. Fill the answer sheet with black / blue ball point only.

S.NO	Question	Key	Content/TOS	Difficulty Level
<b>BIOLOGY</b>				
1.	Chief material present in the cell walls of plants, fungal and prokaryotic cells are:	C	Cell Structure & Function (Cell wall)	Moderate
	A Proteins			
	B Lipids			
	C Polysaccharides			
	D Phospholipids			
2.	Which of the following cells does not have nucleus?	D	Cells Structure & Function - (Nucleus)	Easy
	A Muscle cell			
	B Nerve cell			
	C White Blood cell			
	D Red blood cell			
3.	Most abundant organic compound in mammalian cell is:	D	Biological Molecules	Moderate
	A Water			
	B Lipids			
	C Carbohydrates			
	D Proteins			
4.	Cysts are not resistant to _____ but spores are:	D	Prokaryotes Reproduction (Fission and spore formation)	Easy
	A Light			
	B Desiccation			
	C pH			
	D Heat			
5.	The most successful land adapting plants are:	D	Diversity among Plants (Angiosperms)	Easy
	A Mosses			



	B	Ferns			
	C	Gymnosperms			
	D	Angiosperms			
6.	Intrinsic factor is secreted by				
	A	Pancreas			
	B	Liver			
	C	Stomach	C	Life Processes in Pancreas Animals & Plants (Life processes in animals)	Medium
	D	Duodenum			
7.	In human gut, chylomicrons are formed by the combination of:				
	A	Proteins and carbohydrates			
	B	Fats and proteins (Intestine)	B	Life Processes in animals & Plants (Intestine)	Hard
	C	Fats and carbohydrates			
	D	Vitamins and fats			
8.	Which organ is called as the body's thermostat?				
	A	Pituitary gland			
	B	Kidneys			
	C	Hypothalamus	C	Homeostasis	Easy
	D	Adrenal gland			
	Myofibrils within the muscle fibers contain thick and thin filaments made up of _____ and _____ respectively:				
	A	Myosin and actin	A	Support and Movement	Medium
	B	Globulin and albumin			
	C	Troponin and Tropomyosin			
	D	Fibrin and Fibrinogen			
10.	Which hormone is chemically a steroid?				
	A	ADH			
	B	Thyroxine	C	Coordination and Control (Chemical Coordination Hormones)	Medium
	C	Cortisone			
	D	Insulin			
11.	Which brain portion is responsible for controlling body coordination?				
	A	Medulla			
	B	Amygdala	C	Coordination and control (Human Nervous system)	Easy
	C	Cerebellum			
	D	Pons			
12.	Erythroblastosis foetalis occurs when mother is Rh -ve and father is:		B	Variation and Genetics Inheritance	Hard

	A	Also Rh -ve			
	B	Rh +Ve			
	C	Haemophilic			
	D	Color blind			

## CHEMISTRY

13.	Many elements have fractional atomic masses. This is because:	D	Intro to Fundamental Concepts of Chemistry (Basic Concepts/ Atomic masses)	Moderate
	A	Mass of atom is itself fractional		
	B	Atomic masses are average masses of isobars		
	C	Atomic masses are average masses of isotopes		
	D	Atomic masses are average masses of isotopes proportional to their abundance		
14.	Identify the correct option with same empirical formula for both compounds:	D	Intro to Fundamental Concepts of Chemistry (Basic Concepts/ Empirical Formula)	Hard
	A	H <sub>2</sub> O & H <sub>2</sub> O <sub>2</sub>		
	B	C <sub>6</sub> H <sub>12</sub> & C <sub>6</sub> H <sub>6</sub>		
	C	H <sub>2</sub> S <sub>2</sub> O <sub>3</sub> & H <sub>2</sub> SO <sub>4</sub>		
	D	C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> & CH <sub>3</sub> COOH		
15.	1 mole of a substance contains _____ particles.	A	Intro to Fundamental Concepts of Chemistry (Moles)	Easy
	A	$6.02 \times 10^{23}$		
	B	$6.02 \times 10^{24}$		
	C	$6.02 \times 10^{22}$		
	D	$3.01 \times 10^{23}$		
16.	Which of the following orbital will be filled first than 4p?	C	Atomic structure (Quantum Numbers)	Moderate
	A	4s		
	B	2p		
	C	3d		
	D	1s		
17.	When number of moles of reactants and products are equal in reversible reactions, which parameter would not affect at equilibrium?	B	Chemical Equilibrium (Le-Chatelier's Principle)	Moderate
	A	Temperature		
	B	Pressure		
	C	Volume		
	D	Catalyst		
18.	Ice floats on the surface of water due to:	D	Solids (Molecular solids)	Easy
	A	Larger bond length		
	B	Cubic structure of ice		



	C	Weak intermolecular forces			
	D	Empty spaces in the structure of ice			
19.	Acidic buffer consists of :		B	Chemical Equilibrium (Acid base /Buffer solutions)	Moderate
	A	Strong acid and salt of it with a weak base			
	B	Weak acid and salt of it with a strong base			
	C	Strong acid and salt of it with a strong base			
	D	Weak acid and salt of it with a weak base			
20.	The breakdown of a substance with current is:		C	Electrochemistry	Easy
	A	Thermolysis			
	B	Catalysis			
	C	Electrolysis			
	D	Photolysis			
21.	Which statement is incorrect regarding a chemical bond?		D	Chemical Bonding (Energetics of Bond)	Moderate
	A	Bond is formed by the overlapping of half filled orbitals			
	B	Bond is formed by the attraction of positive and negative ions			
	C	Bond is formed by the overlapping of "s" orbital is strong			
	D	Bond formed by the large sized atoms is strong			

## PHYSICS

22.	The product of force and time is equal to:		C	Force and motion (Linear momentum)	Easy
	A	Angular momentum			
	B	Force			
	C	Change in momentum			
	D	Velocity			
23.	Kilowatt-hour is unit of?		A	Work and Energy	Moderate
	A	Electric Energy			
	B	Power			
	C	Momentum			
	D	Torque			
24.	Trough of a wave acts as:		A	Waves / Trough	Moderate
	A	Concave lens			
	B	Convex lens			
	C	Convex mirror			
	D	Plane mirror			

25.	Two positive point charges are placed 2m apart. The electric potential at mid-point due to these two charges will be:	A	Electrostatic / Electric potential	Moderate
	A Added to double			
	B Reduced to half			
	C Remains same (no effect)			
	D Cancel each other effect			
26.	If length of the wire becomes two times to its original value and area becomes one half to its original value, then resistance of the wire becomes:	B	Current Electricity (Resistivity and its dependence upon temperature)	Hard
	A Double			
	B Four times			
	C One half			
	D One fourth			
27.	The conversion of alternating current into direct current is:	B	Electronics (Rectification)	Easy
	A Amplification			
	B Rectification			
	C Oscillation			
	D Resonance			

## ENGLISH

28.	Choose the correct option.	A	Subject verb agreement	Moderate
	A The Three Musketeers was written by Dumas.			
	B The Three Musketeers were written by Dumas.			
	C The Three Musketeers has written by Dumas.			
	D The Three Musketeers have written by Dumas.			
29.	What is the antonym of "Mumbled"?	C	Vocabulary	Easy
	A Unprovoked			
	B Quiver			
	C Loud			
	D Rarely			
30.	Select the right sentence.	A	Sentence structure	Hard
	A He opened the square red wooden box.			
	B He opened the red square wooden box.			
	C He opened the wooden red square box.			
	D He opened the red wooden square box.			

NMDCAT - National MDCAT 2020

Chemistry Part

Alhamdulillah - we have explained each point in our Classes and present in our books (All Series) along with Tricks of NMDCAT

NMDCAT in my Pocket (Our YouTube Channel)

Download our mobile app "Ali Series"

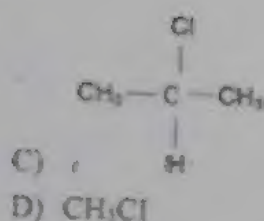
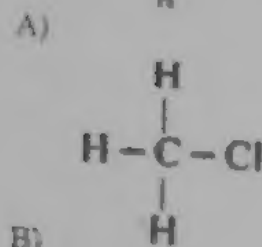
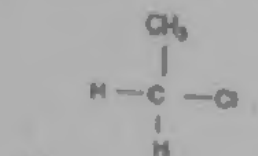


1. Alkyl Halides involving -C-X bond breakage and -C-Nu bond formation simultaneously would follow the mechanism.

- A)  $SN^1$  B)  $SN^2$   
C)  $E^1$  D)  $E^2$

[Alkyl halide]

2. Secondary Alkyl Halides is:



D)  $CH_3Cl$

[Alkyl halide]

3. R-X on reaction with alcohols forms:

- A) R-OH B) ROR  
C) R-X-OH D) RH

[Alkyl Halides]

4. IUPAC name of  $C_6H_{12}O(CH_3)_2$  is:

- A) 2-Methyl-3-Hexanone  
B) 2,6-Dimethyl cyclohexanone  
C) 3-Methyl cyclohexanone  
D) 4-Methyl-3-hexanone

[Alcohols, Phenols, and Ethers]

5. Phenol is known as:

- A) Carbolic acid B) Carbonylic acid  
C) Carboic acid D) Carbolylic acid

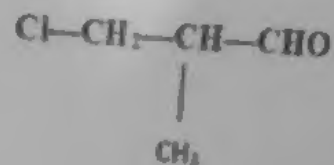
[Alcohols, Phenols, and Ethers]

6. Phenol is more acidic than alcohols because of the following reason:

- A) Delocalization of negative charge in the OH group  
B) Delocalization of positive charge on the carbon atom in ring  
C) Delocalization of negative charge in the ring  
D) Delocalization of positive charge in the OH group

[Alcohols, Phenols, and Ethers]

7. The common name of the following aldehyde is:



- A)  $\alpha$ -methyl- $\gamma$ -chloro Propionaldehyde  
B)  $\beta$ -Chloro- $\gamma$ -methyl Propionaldehyde  
C)  $\beta$ -Chloro- $\alpha$ -methyl Propionaldehyde  
D)  $\beta$ -methyl- $\alpha$ -Chloro Propionaldehyde

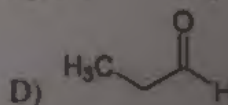
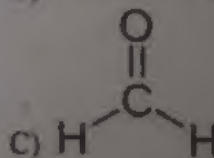
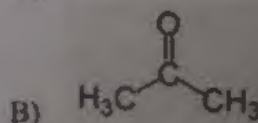
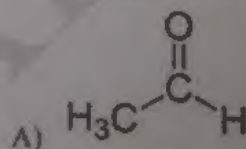
[Alkyl Halides]

8. Which of the following reagent is used to separate and purify carbonyl and non-carbonyl compounds?

- A) HCN B)  $BrMgCH_3$   
C)  $NaHSO_3$  D)  $H_2O$

[Tests - Chemistry in my Pocket Book]

9. Secondary alcohol is the product of reduction of which carbonyl compound?



[Alcohols, Phenols, and Ethers]

10. Which of the following is the strongest acid?

- A) Propanic acid  
B) Fluoroethanoic acid  
C) Trichloroethanoic acid  
D) Nitroethanoic acid

[Carbonylic Acid]

11. Hydrolysis of acyl chloride results in the formation of:

- A) Acid anhydride  
B) Carboxylic acid  
C) Amides  
D) Ester

[Chapter: Carbonyl compounds 2: Carboxylic Acid and Functional Derivatives]

12. The exact reactivity order for carboxylic acid derivatives is:

- A) Anhydride > Acylchloride > ester  
B) Ester > Anhydride > Acylchloride  
C) Amide > Acylchloride > ester  
D) Acylchloride > Anhydride > ester

[Carboxylic Acid]

13. Based on the physio-chemical properties, proteins may be classified into the following types:

- A) Simple proteins  
B) Compound proteins  
C) Derived proteins  
D) All of the above

[Macromolecules]

14. Based on function, thyroxine can be classified as:

- A) Hormonal protein  
B) Structural protein  
C) Transport protein  
D) Genetic protein

[Biochemistry]

15. L- Asparaginase enzyme has been used for the treatment of:

- A) Jaundice  
B) Blood Cancer  
C) Wickets  
D) Eat disease

[Biochemistry]

16. Potassium, Rubidium, Cesium react with oxygen to form which types of oxides?

- A) Peroxide  
B) Superoxide  
C) Suboxide  
D) Normal Oxide

[s and p block elements]

17. Magnesium reacts with Nitrogen to form:

- A)  $Mg_2N_2$   
B)  $Mg_3N_2$   
C)  $MgN_2$   
D)  $MgN$

[s and p block elements]

18. Densities of alkali metals are low due to:

- A) Weak intermolecular forces  
B) Large atomic volume  
C) Smaller size  
D) Configuration

[s and p block elements]

19. In 3<sup>rd</sup> series of transition elements, paramagnetic behavior is maximum for  $Mn^{2+}$  and:

- A)  $Cr^{2+}$   
B)  $Ti^{3+}$   
C)  $V^{3+}$   
D)  $Zn^{2+}$

[d and f block elements]

20. Electronic configuration of chromium (Proton number 24) is:

- A)  $[Ar] 3d^4 4s^2$   
B)  $[Ar] 3d^5 4s^1$   
C)  $[Ar] 3d^5 4s^2$   
D)  $[Ar] 3d^4 4s^2$

[d and f block elements]

21. The transition element which does not show variable valency is:

- A) Cu  
B) Sc  
C) Zn  
D) Cr

[d and f block elements]

22. Select the organic compound which belongs to arene family.

- A)  $CH_2=CH_2$   
B)  $CH_3-O-CH_3$   
C)  $CH_3-NH_2$   
D)  $C_2H_6$

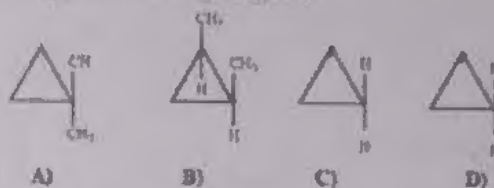
[Hydrocarbon]

23. The type of isomerism existing in a compound of molecular formula  $C_4H_{10}O$  is:

- A) Functional group  
B) Position  
C) Chain  
D) Metamerism

[Hydrocarbon]

24. Which of the following compounds show geometric isomerism?



[Hydrocarbon]

25. Generic formula of cycloalkane is?

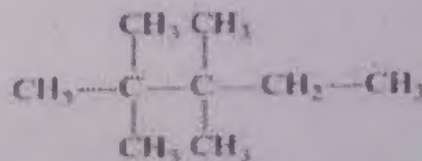
- A)  $C_nH_{2n+2}$   
B)  $C_nH_{2n}$   
C)  $C_nH_{2n+1}$   
D)  $C_nH_{2n-2}$

[Hydrocarbon]

26. Electrophile in Sulphonation of benzene is:

- A)  $HSO_4^-$   
B)  $H_2SO_4$   
C)  $SO_3$   
D)  $HSO_3^-$

27. The following has IUPAC name of:



- A) 2,3 - tetramethyl butane  
B) 2,2,3,3 - tetramethyl pentane  
C) 3,3,4,4 - tetramethyl butane  
D) 3,4- bis (dimethyl butane)

[Hydrocarbon]

28. Acetophenone can be formed by which of the following reaction of benzene?

- A) Alkylation  
B) Acylation  
C) Halogenation  
D) Nitration

29. In alkanes, each Carbon has hybridization:

- A)  $sp^3$   
B)  $sp$



30. When  $\text{CH}_3$  is attached with the benzene ring, it makes the ring:  
 A) Good electrophile  
 B) Good nucleophile  
 C) Resonance hybrid  
 D) Extraordinary stable  
 [Hydrocarbon]
31. Which of the following reaction has greater  $K_p$  than  $K_c$  ( $K_p > K_c$ )?  
 A)  $2\text{NO} + \text{Cl}_2 \rightleftharpoons 2\text{NOCl}$   
 B)  $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$   
 C)  $2\text{NOCl} \rightleftharpoons 2\text{NO} + \text{Cl}_2$   
 D)  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$   
 [Chemical Equilibrium]
32. The equation  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  represents:  
 A) Contact process  
 B) Haber's process  
 C) Solvay process  
 D) Avogadro's law  
 [Chemical Equilibrium]
33. The unit of the rate constant is the same as that of the rate of reaction in:  
 A) Zero order reactions  
 B) First order reaction  
 C) Second order reaction  
 D) Third order reaction  
 [Chemical Kinetics]
34. The study of rates of chemical reactions and the factors that affect the rates of chemical reactions is known as:  
 A) Thermodynamics  
 B) Stoichiometry  
 C) Electrochemistry  
 D) Chemical Kinetics  
 [Chemical Kinetics]
35. For the reaction  $\text{A}_{(g)} \rightarrow \text{products}$   
 When the concentration of  $\text{A}_{(g)}$  doubles, the rate of reaction increases four folds, which means it is:  
 A) Negative order reaction  
 B) First order reaction  
 C) Zero order reaction  
 D) Second order reaction  
 [Chemical Kinetics]
36. For which of the following order of the reaction, rate of reaction is inversely proportional to the concentration reaction?  
 A) 1<sup>st</sup> order reaction  
 B) 2<sup>nd</sup> order reaction  
 C) Negative order of reaction  
 D) Zero order of reaction  
 [Chemical Kinetics]
37. The Thermal energy at constant pressure is called:  
 A) Enthalpy  
 B) Internal energy

- C) Heat capacity  
 D) Work done  
 [Thermochemistry]
38. Born-Haber cycle is used to determine the lattice energies of:  
 A) Molecular solids  
 B) Metallic solids  
 C) Ionic solids  
 D) Covalent solids
39. One Calorie is equal to:  
 A) KJ  
 B) J  
 C) 0.418 KJ mol<sup>-1</sup>  
 D) 0.418 KJ  
 [Thermochemistry]
40. The oxidation state of "S" in the  $(\text{S}_2\text{O}_3)^{2-}$  is:  
 A) +4  
 B) +6  
 C) -2  
 D) +2  
 [Electrochemistry & p block]
41. The common oxidation number of halogens is:  
 A) -1  
 B) +1  
 C) -2  
 D) 0  
 [electrochemistry & p block]
42. During oxidation process, oxidation number of element:  
 A) Decreases  
 B) Increases  
 C) Remains constant  
 D) Both A & B  
 [electrochemistry]
43. Which of the following has the highest value of electronegativity?  
 A) I  
 B) Br  
 C) Cl  
 D) F  
 [Electrochemistry & p block]
44. Which of the following hybrid orbitals has maximum "s" -character?  
 A)  $\text{sp}^2$ -hybrid orbital  
 B)  $\text{sp}^3$ -hybrid orbital  
 C)  $\text{sp}$ -hybrid orbital  
 D)  $\text{dsp}^2$ -hybrid orbital
45. The first ionization energy is maximum for:  
 A) Na  
 B) Mg  
 C) Al  
 D) K  
 [s & p block]
46. The efficiency of chemical reaction can be expressed as:  
 A) Theoretical yield  
 B) Actual yield  
 C) % yield  
 D) Maximum yield  
 [Stoichiometry]
47. In a vessel, 10g  $\text{N}_2$ , 10g  $\text{H}_2$  and 10g  $\text{O}_2$  are present. Which one will have least number of atoms?  
 A)  $\text{H}_2$   
 B)  $\text{N}_2$   
 C)  $\text{O}_2$   
 D) Both  $\text{H}_2$  &  $\text{N}_2$   
 [Chemistry]
48. The empirical formula of Glucose  $\text{C}_6\text{H}_{12}\text{O}_6$  is:



- A)  $C_6H_{12}O_6$   
C)  $CH_2O$

- B)  $CHO$   
D)  $CH_2O_2$

[Introduction to Fundamental Concept of Chemistry]  
49. The relationship between quantum number  $n$  and  $l$  is:

- A)  $n = l - 1$   
C)  $l = n - 1$

- B)  $0.1 = n - 2$   
D)  $n = l - 2$

[Atomic Structure]

50. Quantum number values for  $2p$  orbitals are:

- A)  $n=2, l=1$   
C)  $n=1, l=0$

- B)  $n=1, l=2$   
D)  $n=2, l=0$

[Atomic Structure]

51. Which pair has 1 electron in its 's' orbital?

- A) Li & Fe  
C) K & Mn

- B) Na & Cr  
D) H & He

52. Which of the following has the lowest  $e/m$  ratio?

- A)  $Li^{+2}$   
C)  $He^+$

- B)  $H^{+1}$   
D) Be

[Atomic Structure]

53. According to the general gas equation, density of an ideal gas depends upon:

- A) Pressure  
B) Temperature  
C) Molar mass of the gas  
D) All of the above

[Gases]

54. The actual volume of gas molecules is considered negligible at following pressures:

- A) 2 atm  
C) 6 atm

- B) 4 atm  
D) 8 atm

[Gases]

55.  $CO_2$  and  $SO_2$  both are tri-atomic molecules but heat of vaporization of  $SO_2$  is greater than that of  $CO_2$  due to:

- A) High electronegativity of S  
B) Greater size of  $SO_2$   
C)  $SO_2$  is polar and  $CO_2$  is non-polar  
D)  $SO_2$  is more acidic than  $CO_2$

56. Which of the following has the lowest vapour pressure at  $20^\circ C$ ?

- A) Diethyl ether  
B) Chloroform  
C) Carbon tetrachloride  
D) Water

[Liquids]

57. Which of the following is not a molecular solid?

- A) Bromine  
C) Phosphorus

B) Sulphur

D) Carbon dioxide

[Solids]

58. The Lattice energy is also called as:

- A) Energy of affinity  
B) Bond energy  
C) Crystal energy

D) Potential energy

59. For a gaseous phase reaction, when number of moles of reactants and products are equal:

- A) The values of  $K_p$  and  $K_c$  are different  
B) The values of  $K_p$  is greater than  $K_c$   
C) The values of  $K_c$  is greater than  $K_p$   
D) The values of  $K_p$  and  $K_c$  are the same

[Chemical Equilibrium]

60. Purification of table salt ( $NaCl$ ) by passing  $HCl$  gas through its saturated aqueous solution is an example of:

- A) Law of mass action  
B) Hess's law  
C) Common ion effect  
D) Henry's

[Chemical Equilibrium/Acids, Bases and Salts]

NMDCAT English 2020

1. We prefer fruits \_\_\_\_\_ Sweets.

- A) To  
C) Over

B) On

D) From

[Correct use of preposition]

2. Choose the correct spelling

- A) Exantuated.  
C) Accenchuated.

B) Axantuated.

D) Accentuated.

[use of writing conventions of spelling]

3. Choose the correct spelling

- A) Cotioned.  
C) Causchuned.

B) Cautioned.

D) Coschuned.

[use of writing conventions of spelling]

4. Choose the correct spelling

- A) Eccentric.  
C) Akcantric.

B) Eckentric.

D) Accentric.

[use of writing conventions of spelling]

5. Choose the correct spelling.

- A) Dafinite.  
C) Dafanite.

B) Defanit

D) Definite.

[use of writing conventions of spelling]

6. The Headmaster \_\_\_\_\_ to speak to you.

- A) Wants.  
C) Was wanting.

B) Is wanting.

D) Want.

[Tenses]

7. Choose the correct option:

Knowledge and wisdom no time for connection.

- A) Has  
C) Had

B) Have

D) Are

[Question Type: Subject verb agreement]

8. Identify the errors and choose the correct option:

I hope this letters finds in the best of your spirits

- A) I hope this letter will find you in good of high spirits.  
B) I hope this letter finds you in best of your spirit.  
C) I hope letter finds you in the best of spirits.  
D) I hope the letter found you in greatest of sprite

[Tenses]



9. Identify the errors and choose the correct option:  
Gulliver travel was written by Swift  
A) Gulliver travels was written to Swift.  
B) Gulliver travels was written at Swift.  
C) Gulliver's Travels was written by Swift.  
D) Gulliver's travel was written by Swift

[Correct use of article]

10. Fill in the blank with appropriate article as required.

Umbrella is of no avail against a thunderstorm.

- A) The  
C) An

B) A

D) No article required

[Correct use of article]

11. Choose the correct sentence.

- A) I wish I have been a millionaire.  
B) I wish I am being a millionaire.  
C) I wish I were a millionaire.  
D) I wish I was millionaire

[Question Type: Subject verb agreement]

12. Pick the correct option:

- A) No star is brighter than the moon.  
B) No star is more bright than the moon.  
C) No star is brighter then the moon.  
D) No star is brighter than moon.

[Correct use of article]

13. Choose the correctly structured sentence.

- A) Had he lived in England he would miss his family.  
B) Had he lived in England, he would have missed his family.  
C) Had he lived in England he had missed his family.  
D) Had he live in England he will missed his family.

[Structure of sentence]

14. She always carried an umbrella. The sentence indicates \_\_\_\_\_ tense.

- A) Present tense.  
C) Past perfect.

B) Past simple.

D) Present perfect.

[Tenses]

15. Ahmed \_\_\_\_\_ me for a long time.

- A) Know  
C) Knows

B) Have known.

D) Knew

[Question Type: Subject verb agreement]

16. Pick the correct option:

His first inning consists of four 6s and three 4s.

- A) His first inning's consists of four 6s. and three 4s  
B) His first innings consist of four 6's and three 4's  
C) His first inning consists of four C's and three 4's  
D) His first innings consist of four 6's and three 4's

[use of writing conventions of punctuation]

Choose the correctly punctuated sentence:

- A) What a fall was there, my countrymen! Long live the king!  
B) What a fall was there! My countrymen Long live the king!

- C) What a fall was Merc, my countrymen Long live the king.  
D) What a fall There, my countrymen, Long live the king.

[use of writing conventions of punctuation]

18. Choose the correct option:

- A) He and I was playing  
B) He and I were playing.  
C) He and I were being playing  
D) He and I was being playing.

[Question Type: Subject verb agreement]

19. Choose the correct option

- A) Eve, one of the prisons are fun  
B) Every one of the prisons had full  
C) Every one of the prisons have  
D) Every one of the prisons is full.

[Question Type: Subject verb agreement]

20. Not only the parents but also their \_\_\_\_\_ for interview.

A) Has called

B) Have called

C) Have been caned

D) Has been called

[Question Type: Subject verb agreement]

### NMDCAT Physics 2020

1. If during circular motion, tangential velocity of a body becomes double then centripetal force becomes:

- A) Double.  
C) Four times

B) One half

D) One fourth

2. Under what condition an object will have zero displacement but non-zero distance?

- A) Linear motion  
C) Random motion

B) Circular motion

D) Oscillation

3. Which one of the following properties is exhibited by the longitudinal waves?

- A) Interference  
C) Diffraction

B) Reflect

D) Polarization

4. The speed of sound in air is 332m/s. The speed of sound at 22 °C be:

- A) 345.2 m/s  
C) 350 m/s

B) 340 m/s

D) 330 m/s

5. Astronomers calculate speed of distant stars and galaxies using which of the following phenomena?

- A) Beats  
C) Super position

B) Interference

D) Doppler Effect

6. In a ripple tank, 40 waves pass through a certain point in 1 second. If the wavelength of the wave is 5 cm, then speed of the wave is:

- A) 0.5ms<sup>-1</sup>  
C) 1.5 ms<sup>-1</sup>

B) 1ms<sup>-1</sup>

D) 2ms<sup>-1</sup>

7. Which process entire of heat supplied to the gas converted to the internal energy of the gas.

- A) Isochoric process  
C) Isothermal process

B) Isobaric process

D) Adiabatic process.

8. The internal energy of a system during an isothermal process:

- A) Decreases  
C) Becomes zero  
B) Increases  
D) Remain constant
9. If the potential at a point which is 1m from a charge is 1 volt, the the potential at a point is 2m from the same charge will be:  
A) 2v  
C) 0.5v  
B) 1v  
D) 2v
10. The values of electric intensity will \_\_\_\_\_ due to the presence of dielectric medium  
A) Increase  
B) Increase exponentially  
C) Decrease  
D) Remain same
11. The slope of distance-time graph will always be:  
A) Negative.  
C) Zero  
B) Positive.  
D) Maximum.
12. At what angle of projection of a projectile the range becomes half of its maximum value.  
A)  $15^\circ$   
C)  $30^\circ$   
B)  $20^\circ$   
D)  $40^\circ$
13. If we drop an object its initial velocity is zero. How far will it fall in time t.  
A)  $9.8t^2$   
C)  $0.49t^2$   
B)  $4.9t^2$   
D)  $90t^2$
14. The Newton-second is unit a  
A Work  
C) Impulse  
B) Power  
D) Momentum
15. A 1.75m height weight-lifter raises weight with a mass of 51kg to a height of 0.5m above his head. How much work is being done by him, ( $g = 10\text{ms}^{-2}$ )  
A) 2125J  
C) 50J  
B) 2500J  
D) 1225J
16. What is the speed of 2.0 kg metallic bob at mean position of a simple pendulum, when releases from its extreme position of a simple high? ( $g = 10\text{ms}^{-2}$ )  
A)  $3.16\text{ms}^{-1}$   
C)  $100\text{ms}^{-1}$   
B)  $10\text{ms}^{-1}$   
D)  $50\text{ms}^{-1}$
17. When the speed of your car is halved, by what factor does its kinetic energy decreases?  
A) 1/2  
C) 1/8  
B) 1/4  
D) 1/6
18. Which one of the following force is non-conservative force?  
A) Frictional force  
C) Electric force  
B) Gravitational force.  
D) Elastic spring force.
19. The earth rotates on its axis once a day. Suppose, by some process the earth contracts so that. Radius is only half as large as at present, then how long the earth will take to complete its rotation?  
A) 24 Hours  
C) 6 Hours  
B) 18 Hours  
D) 12Hours
20. 1 radian is equal to:  
A)  $57.1^\circ$   
C)  $57.3^\circ$   
B)  $57.2^\circ$   
D)  $57.4^\circ$
21. In transmission from grid station, power losses are minimized by  
A) Increasing current  
B) Decreasing current  
C) Increasing resistance  
D) Increasing voltage
22. The domestic electricity supply has a frequency of:  
A) 150 Hz  
C) 50 Hz  
B) 100 Hz  
D) 25 Hz
23. PIV stands for:  
A) Positive inverse charge.  
B) Power integrated voltage.  
C) Peak inverse voltage.  
D) Peak integrated voltage.
24. In full wave rectification, diodes are used:  
A) 1  
C) 3  
B) 2  
D) 4  
(According. Other Province Text books) (Hopefully they will consider it Correct too)
25. The wavelength associated with an electron is of the order of:  
A) Visible light  
C) Had. Waves  
B) X.rays  
D) Infrared
26. Which photon carries the most energy,  
A) Blue.  
C) Red  
B) Violet.  
D) Green.
27. Which one of the following series lies in ultraviolet region?  
A) Balmer series.  
C) Lyman series.  
B) Pascher series.  
D) Break Series.
28. The main Difference between X-rays and  $\gamma$  -rays is:  
A) Frequency.  
C) Energy.  
B) Wave length.  
D) Origin.
29. There are initially 400 atoms in a radioactive sample. What of atom after 3 half life?  
A) 400  
C) 50  
B) 200  
D) 25
30. While using radiation therapy, cancerous thyroid is treated with radioisotope:  
A) Carbon.  
C) Thorium.  
B) 235 Uranium  
D) Iodine
31. In capacitors, energy is stored in the form of  
A) Gravitational energy.  
C) Electric intensity  
B) Kinetic energy.  
D) Magnetic induction
32. Ohm time's farad is equivalent to:  
A) Time.  
C) Distance  
B) Charge  
D) Capacitor.
33. One kilo watt-hours is commonly termed as one commercial unit of electric energy  
Equal to:  
A)  $3.6 \times 10^5\text{J}$   
C)  $3.6 \times 10^4\text{J}$   
B)  $3.6 \times 10^6\text{J}$   
D)  $3.6 \times 10^3\text{J}$



34. When a wire is compressed and its radius becomes 2R then its resistance will be:  
 A) 1.6R  
 B) 4R  
 C) 1/16R  
 D) 1/4R
35. One of the following is an Ohmic device:  
 A) Filament  
 B) Semiconductor diode.  
 C) Transistor.  
 D) Copper wire
36. The change in resistance of metallic conductor at temperature below  $0^{\circ}\text{C}$  :  
 A) Nonlinear  
 B) Curve  
 C) Linear.  
 D) Curvilinear.
37. When current are flowing through two long parallel wires in same direction electric field between them is :  
 A) Strong.  
 B) Weak.  
 C) Remains constant  
 D) Infinite
38. Magnetic flux is maximum when angle between magnetic field and vector area is:  
 A)  $0^{\circ}$   
 B)  $90^{\circ}$   
 C)  $180^{\circ}$   
 D)  $45^{\circ}$
39. Transformer is de. which steps up or steps down the input:  
 A) Current  
 B) Voltage  
 C) Energy  
 D) Power
- If a stationary bar magnet is placed earn coil at rest so maximum lines of force passes through the coil, the galvanometer shows:  
 A) 14arnum current  
 B) Minimum current  
 C) No current  
 D) Intermediate value of current

### NMDCAT Biology 2020

1. When the temperature of the surrounding rises, body responds by:  
 A) Vasoconstriction  
 B) Vasodilation  
 C) Shivering  
 D) Raising body hairs
- The excretion of hypertonic urine in humans is associated best with the:  
 A) Glomerular capsule  
 B) Convoluted tube  
 C) Loop of Henle  
 D) Distal convoluted tubule
- In humans, the temperature regulation control center is located in:  
 A) Kidney  
 B) Brain  
 C) Lungs  
 D) Liver
- As an excretory organ, liver:  
 A) Detoxifies many chemical poisons  
 B) Produces ammonia for excretion, the kidneys  
 C) Produces urea and uric acids from the nitrogen of amino acids  
 D) All of the above
- The active uptake of sodium in the ascending limb or thick loop of Henle is promoted by the action of:  
 A) Aldosterone  
 B) Thyroxine

2. Which of following muscles are considered as voluntary Muscles.  
 A) Smooth muscles  
 B) Cardiac muscles  
 C) Skeletal muscles  
 D) Glandular muscles
3. Which of following are "myogenic type of muscles?"  
 A) Glandular muscles  
 B) Cardiac muscles  
 C) Skeletal muscles  
 D) Smooth muscles
4. What do we call the surface membrane of a muscle fiber.  
 A) Sarcolemma  
 B) Plasma membrane  
 C) Sarcoplasm  
 D) Myofibrils
5. Which of the following neurotransmitters decreasing our perception of pain.  
 A) Epinephrine  
 B) Serotonin  
 C) Dopamine  
 D) Endorphins
6. Which body function is controlled through positive feed-back mechanism?  
 A) Labor contractions  
 B) Body temperature  
 C) Insulin production  
 D) Thyroxine release
7. Which one of the following is common to all neurons?  
 A) A cell body which contains a nucleus  
 B) A thick myelin sheath  
 C) Presence of node of Ranvier  
 D) Presence Schwann cells
8. Neurons are cells adapted for the rapid transmission of electrical impulses. To do this, they have long thin processes called:  
 A) Axons  
 B) Dendrites  
 C) Myelin sheath  
 D) Schwann cell
9. A \_\_\_\_\_ is a junction between two neurons or between a motor neuron and a muscle cell:  
 A) Impulse  
 B) Synapse  
 C) Axon  
 D) Cleft
10. Which one of the following represents the changes that occur in the oval, on the uterus approximately every 28 days involving ovulation with the breakdown and loss of the lining of the uterus,  
 A) Ovulation  
 B) Menstrual cycle  
 C) Uterine cycle  
 D) Embryo formation
11. Which of the following diseases is sexually transmitted?  
 A) Tuberculosis  
 B) AIDS  
 C) Dengue Fever  
 D) Cholera
12. Which of the following hormones of the pituitary gland regulate the menstrual cycle,  
 A) Follicle Stimulating Hormone and estrogen  
 B) Luteinizing hormone and estrogen  
 C) Follicle Stimulating Hormone and Luteinizing hormone  
 D) Estrogen and progesterone

17. Hemophilia A and B, color blindness and testicular are example of:  
 A) X-linked dominant trait B) Y-linked recessive trait  
 C) Y linked inheritance D) Pseudoautosomal trait
18. Which traits are most likely to affect men than women?  
 A) X linked recessive B) X linked dominant  
 C) Autosomal dominant D) Autosomal recessive
19. \_\_\_\_\_ alleles both have an effect on the phenotype of a heterozygous organism:  
 A) Dominant B) Recessive  
 C) Co-dominant D) Multiple
20. When both the alleles of a gene pair are same, the organism is said to be:  
 A) Heterozygous B) Genotype  
 C) Homozygous D) Phenotype
21. In which type of cells, cell wall is not present,  
 A) Plant cogs B) Fungal Cells  
 C) Bacterial cells D) Liver cells
22. 70S sized ribosomes are found in the cells of:  
 A) Algae B) Fungi  
 C) Protozoans D) Bacteria
23. According to the Mad mosaic model of cell membrane, which zone is embedded is  
 A) Hydrophobic B) Hydrophilic  
 C) Globular D) Filamentous
24. The membrane separating the vacuole from cytoplasm is called:  
 A) Cristae B) Cisternae  
 C) Tonoplast D) Vacuolar membrane
25. Select, one which is not a function of Smooth Endoplasmic Reticulum (SER)?  
 A) Metabolism lip.  
 B) Transmission of impulses  
 C) Transport of materials  
 D) Processing of glycoproteins
26. Which of the following organelles are involved in like synthesis of plant cell wall,  
 A) Endoplasmic reticulum B) Golgi complex  
 C) Lysosomes D) Peroxisomes
27. Which property of water helps to maintain the integrity of lipid bilayer membranes  
 A) Specific heat capacity  
 B) Hydrogen bonding  
 C) Cohesion and adhesion  
 D) Hydrophobic exclusion
28. Water act as universal solvent because of:  
 A) Heat of vaporization B) Hydrogen bonding  
 C) High polarity  
 D) Cohesion and adhesion
29. Lipids store double amount of energy as compared to carbohydrate because of:  
 A) High proportion of oxygen  
 B) High C : O ratio  
 C) Low proportion of Carbon  
 D) High proportion of C-H
30. Which of the following is an unsaturated fatty acid?  
 A) Oleic acid B) Palmitic acid  
 C) Butyric acid D) Acetic acid
31. Mono-saccharides have a general formula represented by:  
 A)  $C_n(H_2O)_n$  B)  $C(H_2O)_n$   
 C)  $C_2(H_2O)_n$  D)  $C_n(H_2O)_{n-1}$
32. NAD is an example of:  
 A) Mononucleotide B) Dinucleotide  
 C) Tri nucleotide D) Tetra nucleotide
33. Lock and Key Model for enzyme action proposed by Emil Fischer suggests that  
 A) Enzymes are unbiased for the substrate  
 B) Enzymes can modify their active sites  
 C) Enzymes are restricted to one reaction type  
 D) An enzyme catalyze variety of reactions
34. Most enzymes have an optimum temperature of around:  
 A) 30 °C B) 40 °C  
 C) 50 °C D) 20 °C
35. Enzymes work, lowering the \_\_\_\_\_ of the reaction they catalysis.  
 A) Kinetic energy B) Activation energy  
 C) Heat energy D) Potential energy
36. First stable compound during Calvin Cycle is:  
 A) 3-phosphoglycerate  
 B) Glycerolaldehyde 3-Phosphate  
 C) 1, 3 bisphoglycerate  
 D) Ribulose bisphosphate
37. What is the function of Ribulose,  
 A) Intermediates in photosynthesis  
 B) Respiratory Fuel  
 C) Intermediates in cellular respiration  
 D) Component of OM and RNA
38. Which of the following process does NOT need Pyruvic And as a substrate,  
 A) Alcohol mental: ion B) Calvin cycle  
 C) Aerobic respiration  
 D) Lactic acid fermentation
39. Which of the following is a copper containing protein in electron flow chain?  
 A) Plastoquinone B) Cytochrome-C  
 C) Plastocyanin D) Ferredoxin
40. In electron transport chain, ATP synthesis takes place when electrons move from:  
 A) Primary, Electron Acceptor (PEA) to plastoquinone (Pq)  
 B) Plastoquinone (Pq) to cytochromes  
 C) Cytochrome plastocyanin (Pc)  
 D) Plastocyanin (Pc) to Photosystem I (PS I)



41. "Law of independent assortment", states:
- That each pair of alleles assort independently of other pairs of alleles during gamete formation
  - That alleles of each pair of contrasting have unequal probability to assort with the alleles of other pair
  - That the two coexisting alleles for each trait segregate (separate) from each other at meiosis, so that each gamete receives only one of the two alleles
  - That pertain to inheritance of single trait (monohybrid cross)
42. Phenotype is:
- The genetic complement i.e the genes in an individual for a part trait
  - Partner of gene pair
  - The form of appearance of a trait
  - The position of a gene on the chromosome
43. In complete dominance:
- Different alleles of a gene both expressed in heterozygous condition
  - One allele (R) is completely dominant over the other (r) and presence of the recessive allele is functionality hidden. So the heterozygote (Rr) has the same round phenotype as (RR) homozygote.
  - The phenotype of the heterozygotes is intermediate between phenotype of the two homozygotes
  - Gene mutations may produce many different alleles of a gene
44. Which one of the following is found in both messenger RNA and DNA of a mammalian cell,
- Double structure
  - Ribose sugar
  - Thymine
  - Sugar - phosphate backbone
45. The cell in our body are all genetically identical, apart from the:
- Somatic cells.
  - Reproduce cells
  - Muscle fibres
  - White blood cells
46. Transcription is the process in which an RNA copy of the DNA sequence and coding the gene is produced is produced with the help of an enzyme called
- DNA polymerase
  - RNA polymerase
  - DNA transcriptase
  - RNA transcriptase
47. The particular array of chromosomes that an individual possesses is called its:
- Genotype
  - Phenotype
  - Karyotype
  - Allele
48. During meiosis, the homologous chromosomes come together and form pairs, this process is called:
- Synapsis
49. At what phase the DNA content of a cell is doubled?
- Prophase
  - Interphase
  - Anaphase
  - Telophase
50. Which statement correctly describes the transcription of DNA,
- It produces amino acids
  - It produces messenger RNA
  - It results in increased DNA synthesis
  - It is a semi conservative process
51. This theory says that mitochondria and chloroplasts are, in effect, ancient bacteria which now live inside the larger cells,
- Darwin's theory of evolution
  - Lamarckism
  - Neo-Darwinism
  - Endosymbiont theory
52. The organs which are similar in function but differ in structure are called:
- Analogous organs
  - Homologous organs
  - Convergent evolution
  - Divergent evolution
53. \_\_\_\_\_ occurs because natural selection gives some alleles a better chance of survival than others.
- Fitness
  - Evolution
  - Crossing over
  - Artificial selection
54. The DNA that has been altered and which now contains length of nucleotides from two different organisms is called
- Plasmid
  - Combined DNA
  - Vector
  - Recombinant DNA
55. It is a method for rapid production of a very large number or copies of a particular fragment of DNA:
- Gel electrophoresis
  - Polymerase chain reaction
  - DNA extraction
  - Recombination
56. What is the effect of enzyme DNA ligase?
- DNA is broken up at specific sites
  - DNA fragments are joined together
  - DNA replication occurs
  - DNA transcription occurs
57. Which of the following is the components tools of recombinant DNA technology,
- Gene of interest
  - Molecular scissors
  - Molecular glue and expression system
  - All of the above
58. Gel electrophoresis is a technique:
- Employed by forensic scientist to assist in the identification of the individuals by their respective type of DNA
  - Collect all the genes found in one complete set of chromosome

- C) is the technique to separate different sized fragment of charge bearing polymers (proteins, RNA or DNA)  
 D). Grows single cell or a group of cells in a glassware on artificial medium under aseptic conditions
59. **Transgenic organisms:**  
 A) Have a foreign gene inserted into them  
 B) Have an important role in the large scale production of medicinal products  
 C) Are considered beneficial to humans  
 D) All of the above
60. Which of following is not necessary for PCR to occur,  
 A) dATP  
 B) Primers  
 C) DNA fragments  
 D) Ribonucleotides
61. The end product of glycolysis in anaerobic respiration is:  
 A) Ethanol and CO<sub>2</sub>  
 B) Lactate  
 C) Pyruvate  
 D) Acetyl Co A
62. Which of the following is not related to enveloped virus,  
 A) They survive for a short time  
 B) Their envelope is sensitive to sunlight  
 C) They are tolerant to antibodies  
 D) Envelope is derived from host
63. Numerous opportunistic diseases might attack a person suffering from which of the following diseases?  
 A) Measles  
 B) Influenza  
 C) Hepatitis  
 D) AIDS
64. The complete, mature and infection virus particle is known as:  
 A) Venom  
 B) Genome  
 C) Vinon  
 D) Capsid
65. Which of the following is NOT TRUE about Human Immunodeficiency virus (HIV)?  
 A) It is a retrovirus  
 B) It is surrounded by an envelope  
 C) It does not cause AIDS  
 D) It causes deficiency of the human immune system
66. Select a method which causes the oxidation of chemical constituent of a bacterial cell:  
 A) Steam  
 B) Dry heat  
 C) Filtration  
 D) Radiation
67. Which of the following is TRUE about the structure of a typical bacterium?  
 A) It has a cell wall  
 B) It has a cytoplasm  
 C) It has a genetic  
 D) All of the above
68. Red algae do not contribute towards:  
 A) Mold, coral reefs  
 B) Forming limestone deposits  
 C) Making fertilizers  
 D) Forming chalk deposits
69. Which of the following is TRUE about Amoebae,  
 A) They have flagella  
 B) They are multicellular  
 C) They do not cause any disease in humans  
 D) They move by forming specialized cytoplasmic projections called pseudopodia
70. The directional movement toward or away from the stimulus is called,  
 A) Tropism  
 B) Orientation  
 C) Taxis  
 D) Non orientation
71. Photophosphorylation takes place in \_\_\_\_\_ of the chloroplasts:  
 A) Stroma  
 B) Granum  
 C) Inner membrane  
 D) Outer membrane
72. Select an amniote from the following.  
 A) Snake  
 B) Parrot  
 C) Frog  
 D) Crocodile
73. In roots the, apoplast pathway of water disrupted when water reaches:  
 A) Plasmodesmata  
 B) Endodermis  
 C) Cortex  
 D) Pith
74. Regarding structure of the human heart, Chordae tendinae are present in:  
 A) Atria  
 B) Pulmonary valve  
 C) Ventricle  
 D) Aortic valve
- [Not present in KPK Course]
75. The only vein in the human body carrying oxygenated blood is:  
 A) Femoral  
 B) Pulmonary  
 C) Renal  
 D) Mac
76. The cells which play very important role in developing immunity are:  
 A) Monocytes  
 B) Neutrophils  
 C) Lymphocytes  
 D) Thrombocytes
77. Which of the following blood vessels have the highest pressure of blood,  
 A) Aorta  
 B) Pulmonary arteries  
 C) Pulmonary veins  
 D) Vena Cava
78. Autoimmune diseases act at the principle of:  
 A) Self against antigens  
 B) Antigen against self  
 C) Self against self  
 D) Antigen self-destroyed
79. In Human heart left atrium receives  
 A) The superior vena cava  
 B) The inferior vena cava  
 C) The Coronary Sinus  
 D) The four Pulmonary veins
80. Antibodies are manufactured in  
 A) T Lymphocytes  
 B) Red Blood Cells  
 C) Platelets  
 D) B Lymphocytes



## Key and solution of NMDCAT 2020

## Chemistry

1. **Answer: B: Hint:** -C-X bond breaking and Nu bond formation is substitution reaction but simultaneously means that there is an intermediate involved which is  $SN^2$ . In  $SN^1$ , first the X leaves and then nucleophile attacks but there both occur at the same time therefore, it is  $SN^2$ .
2. **Answer: C: Hint:** Cl is attached to the carbon atom which is further attached to 2 carbons therefore, it is primary alkyl halide.
3. **Answer: B: Hint:** ether is formed from the reaction of alcohol and alkyl halide. We have explained the mnemonic for it and also given in Ali Series.  

$$R-X + R-OH \rightarrow R-O-R + R-X$$
4. **Answer:** no one has the given formula but we consider as B.
5. **Answer: C: Hint:** Phenol is called phenol only but the solution of phenol in water (95%) is called Carboic acid.
6. **Answer: C: Hint:** in our class trick of OCARDIO we have already explained that when there is resonance, there is more acidity because of negative charge delocalization in the ring and stability of the phenoxide ion.
7. **Answer: C: Hint:** if the carbon of methyl is considered as alpha, then the next is considered as beta therefore, C is the only correct option.
8. **Answer: C: Hint:** This is the question of common sense. Check the rest of three, which are given in the book with different applications. Only  $NaHSO_4$  is not given and its application is not given.  $NaHSO_3$  is sodium hydrogen sulphite (or sodium bisulphite in old nomenclature) which is used to distinguish the aldehydes, ketones etc. from non-carbonyl compounds.
9. **Answer: B: Hint:** The chart given in A.I Series Book "Chemistry in my Pocket" where oxidation and reduction is explained of full book in a single chart.  
**Super Hint:** Oxidation of ketone always give acid while reduction gives secondary alcohol.
10. **Answer: C: Hint:** when electronegative element is attached to organic compound, its acidity increases. When one fluorine is attached its acidity increases but when 3 chlorines are attached then the acidity increases more than the fluorine.
11. **Answer: B: Hint:** when OH of acid is replaced by any other group, it is called derivative of acid.  $H_2O$  is released when acid derivatives are formed. When water is added again (called hydrolysis), it gives acid back. So hydrolysis of acid derivatives gives carboxylic acid.
12. **Answer: D: Hint:** Reactivity order of acid derivatives. Acylchloride > anhydride > ester > amide > alkyl nitrile.
13. **Answer: D: Hint:** All are types of proteins.
14. **Answer: A: Hint:** Thyroxine is a hormone so the option A is correct as hormonal protein.
15. **Answer: B**
16. **B**
17. **B: Hint:** Magnesium can make  $Mg_3N_2$ .
18. **B**
19. **Answer: A: Hint:**  $Cr^{+3}$  has 3 unpaired electrons as it has electronic configuration  $4s^0, 3d^3$ . Higher the number of unpaired electrons, higher the magnetism.
20. **C: 4 & 9 electrons are not possible in d-subshell**
21. **C: Hint:** Zn has only +2 oxidation state.
22. **Answer: D: Hint:** only benzene is present.  
 Arenes, or Aromatic hydrocarbons are aromatic organic compounds containing only carbon and hydrogen atoms.
23. **A: Hint:** the formula  $C_2H_6O$  can give two isomers one alcohol and other ether. When one formula gives two different groups with different functional group then it is called Functional group isomerism.

Ether =  $\text{CH}_3 - \text{O} - \text{CH}_3$  and Alcohol =  $\text{CH}_3(\text{CH}_2\text{OH})$

24. B Only B can have 2 isomers i.e. cis & trans

25. Answer: B: Hint: Important point alkene and cycloalkane has same generic formula

26. Answer: C: Hint: in sulphonation, neutral electrophile is used (with no positive charge) which comes from sulphuric acid.

27. B: If you wanna detailed answer – visit YouTube Channel or ACA page on Facebook

28. B

29. Answer: A: Hint: There are many simple tricks to solve such MCQs. If you wanna learn in details you can watch my videos on YouTube or Ali Series Book – Chemistry in my Pocket. Trick: When carbon has all single bonds, it is  $\text{sp}^3$  hybridized.

30. Answer: B: Hint: Nucleophile is electron rich. When  $\text{CH}_3$  is attached to benzene, it donates electrons to the benzene ring as it is electron donating group. The benzene ring becomes electron rich (electron density increases on the ring), so it makes it as good nucleophile.

31. Answer: C: Hint: It has simple Trick, if the number of products are more,  $K_p$  will be more than  $K_c$ . It has been explained in video solution as well on our YouTube Channel – ETEA – MDCAT in my Pocket.

32. Answer: B: Hint: the process of ammonia formation is called Haber's process.

33. A: Hint:  $\frac{dx}{dt} = k$  in case of zero order reaction.

34. D: Hint: This is definition of chemical Kinetics

35. D: Hint: if rate of reaction increases 4 times with double concentration, it means it is second order.

36. C: Hint: in negative order, the reaction occurs by force with electricity etc. therefore, rate of reaction is inversely proportional to the concentration. As we know that  $\frac{dx}{dt} = k[A]^{-1}$  or  $\frac{dx}{dt} = k/[A]$  Note: A is reactant.

37. Answer: A: Hint: at constant pressure, the heat flow for any process is equal to the change in the internal energy of the system plus the PV work done.

Conditions of constant pressure is the state function, 'enthalpy (H)' is defined as  $H = U + PV$ .

38. Answer: C: Hint: Lattice energy is calculated of ionic solids by Born-Haber cycle.

39. Answer: B: Hint: 1 Calorie = 4.18J

40. D

41. Answer: A: Hint: Fluorine has only -1, while others have common oxidation number -1 but other oxidation numbers are also exhibited by halogens.

42. Answer: B: Hint: as the positive charge increases or negative decreases so the oxidation number increases.

43. Answer: D: Hint: fluorine has the highest electronegativity in periodic table.

44. Answer: C: Hint:  $\text{sp}$  has 50% s character which is maximum in all hybrid orbitals.

45. Answer: B: Hint: In Mg, the s subshell is fully filled, therefore, it has maximum ionization energy in the given elements.

46. C: % yield shows the efficiency of chemical reaction.

47. Answer: C: Hint: Trick: more the molar mass, least will be the number of atoms. You don't need to do calculations, use tricks of my class or book.

48. Answer: C: Hint: divide all the numbers of the atoms in the formula by 2 and it gives C.

49. C

50. A: Answer: B: Hint: Na is in group IA therefore it has 1 electron in its valence shell. Cr has exceptional case in which one electron of s shifts to d to make it half filled.



51. B

52. Answer: D: Hint: charge on Be is zero, it means it has minimum (lowest) charge to mass ratio

53. Answer: D: Hint: density depends on Pressure, Temperature, and molar mass according to the following formula:  $d = \frac{PM}{RT}$



54. Answer: A: Hint: As the pressure decreases the volume becomes negligible with high temperature. The opposite of it makes liquefy.

55. Answer: C: Hint: polarity of  $\text{SO}_2$  makes the heat of vaporization more because of its strong intermolecular forces.

56. Answer: D: Hint: due to hydrogen bond

57. Answer: A: Hint: Bromine is liquid in its natural state therefore, A is considered correct here

58. B

59. Answer: D: Hint: when number of moles are same then  $K_p = K_c$ . When products are more then  $K_p < K_c$ . When reactants are more then  $K_c < K_p$ . If Details are needed, check "Chemistry in my Pocket"

60. Answer: C: Hint: Given in your book

### Keys Biology NMDCAT 2020

1. B

2. C: Hint: given in the federal book (Exercise Question)

3. B: Hint: responses of negative feedback hypothalamus (Brain)

4. D: Hint: in PTB table is given where all these are present

5. A C Hint: (mus) Skeletal muscles are voluntary others are involuntary

6. B

7. A

8. D

9. A

10. A

11. A

12. B

13. B

14. B

15. C

16. X-linked recessive-No  
Correct answer is given

17. A	21. D	25. B	29. A
18. C	22. A	26. D	30. A
19. C	23. C	27. C	31. B
20. D	24. D	28. D	32. C

33. B	37. B	41. C	45. B	49. B	53. D	57. C
34. B	38. C	42. B	46. C	50. D	54. B	58. D
35. A	39. C	43. D	47. B	51. A	55. B	59. D
36. A	40. A	44. B	48. B	52. B	56. D	

60. C: Hint: Pyruvate Aerobic respiration or anaerobic respiration glycolysis ends

at pyruvate Ethanol forms at fermentation

61. C

62. D: Hint: the consequence of AIDS is destruction of immune system.

63. C	65. B	67. C	69. C	71. C	73. C	75. C	77. C	79. D
64. C	66. D	68. D	70. B	72. B	74. B	76. A	78. D	

### Keys: English NMDCAT 2020

Full discussion is present on youtube channel "English in my Pocket"

A Hint: There are three degrees of adjective. Comparative degree – when two things are compared. Superlative

For comparative there are two rules: 1. More is used before the word or er is used at the end of the word. 2. Than is used but when there are words having or at the end such as senior, junior, interior, exterior, posterior, prior - then to is used instead of than in comparative degree. Question Type: Correct use of Preposition

D (Spelling has been taken from the PMC Wordlist given in this book.)

The correct spelling is "Accentuated" which means "to make prominent".

Question Type: use of writing conventions of spelling

3. B (cautioned is from cautious)

The correct spelling is "Cautioned" which means - Warning use of writing conventions of spelling

4. A - The correct spelling is "Eccentric" which means "Strange"

Question Type: use of writing conventions of spelling

5. D - Articles - definite = the, indefinite = a, an it is the same word from here.

6. A verbs called progressive (continuous verbs where ing is used with the verb), non-progressive (ing can't be used with verb). Such verbs are used for feelings, like, love, prefer, want, and wish. Sensors appear, feel, hear, see, smell, taste etc. If ing is used with the non progressive verb, it will be wrong. Therefore, wants is correct

Question Type: Tenses

B Have - Two or more singular nouns or pronouns joined by "and" require a plural verb. We cannot use "had" because there is no past time expression. Detailed video is present on the channel, "English in my Pocket"

**Question Type: Subject verb agreement**

C Hint: Option A Future tense Present tense is used in the letter, therefore, it is incorrect B is not correct because best is superlative degree, it must have "the" before adjective. C is correct. **Tenses**

C Hint: Rule - singular noun with singular verb. Plural noun with plural verb except plural proper. Plural proper noun has all the first letters are capital. In Option A: travels has small t, to is used before Swift. In B, the same mistake has been repeated. C has 1) capital letters 2) singular verb 3) by 3) apostrophe with Gulliver's. **use of writing conventions of capitalization and punctuation**

10. C Hint: Umbrella is common noun, there must be infinite article i.e. an

**Question Type: Correct use of articles**

11. C Hint: As if, as though, would that, if, wish - were or had been is used always. **Subject verb agreement**

12. A Hint: comparative degree (as explained in MCQ No. 1 of English) er + than. er is used at the end of small words and more \_\_\_ with bigger. Generally 6 letters word is considered smaller. Sky, earth - the is used before such words. In D there is no "the" with moon

**Question Type: Correct use of articles**

13. B Hint: third conditional sentence - first part consists of Had + third form of the verb, second part consists of: would have/should have/must have/ought to have.

**Question Type: Structure of sentence**

14. B Hint: This is from the tenses. She + 2<sup>nd</sup> form of the verb. This is from the past simple indefinite

**Question Type: Tenses**

15. C Hint: Ahmad is singular noun, the verb will be present plus s or es.

**Question Type: Subject verb agreement**

16. B Hint: While pluralizing numbers, add apostrophe and then s such as 4's, and 6's.

**Question Type: use of writing conventions of punctuation**

17. A Hint: What/How+ Verb there will be "?". If no verb then no "" at the end. ' is used e.g. What a lovely girl she is! Also ' what a fall was there, my countrymen!' is correct since the line is taken from William Shakespeare's "Julius Caesar"

**use of writing conventions of punctuation**

18. B Hint We use plural verb when "and" joins two words. After "was/were + being" we don't use "Ing-form of the verb" [Subject verb agreement and sentence structure]

19. D Rule: Pronouns like one, none, each, every, either, neither, someone + of + plural noun + singular verb. e.g. one of my friends is playing. [Subject verb agreement]

20. D Either or, Neither... nor, not only....but also are correlative conjunctions. With correlative conjunction, the verb agrees with the second word. "Son" is the second word and it is singular; therefore, we should use "Has been".

**Question Type: Subject verb agreement**

### Keys and Solution Physics NMDCAT 2020

1. Answer: C:

Solution: During Circular Motion'

V= Double, r= Constant

$$F_c = \frac{mV^2}{r}$$

$$F_c = 4F_c$$

2. B

3. D

4. Answer: A: Solution

$$v_t = v_o - 0.61 v_t$$

$$v_t = 22^\circ$$

$$v = 332 + 0.61 \times 22$$

$$v = 345.4$$

5. D

6. Answer: D:

Solution: V =

$$f\lambda: f = \frac{40}{1}$$

$$\lambda = 50 \text{ cm}$$

$$V = 50 \times 40$$

$$= 2000 \text{ cm/sec}$$

$$V = 2 \text{ m/sec}$$

7. Answer: A:

Solution:

$$\Delta Q = \Delta v + \Delta w$$

$$\Delta w = 0$$

$$\Delta v = 0$$

$$\Delta Q = \Delta v$$

8. D

9. C

10. C

11. B

12. A

13. B

14. Answer:

C: Solution: (D is the 2<sup>nd</sup> Best Option)

15. D

Correct option is Missing. Correct Answer is 1125J and D is the most appropriate option.

16. A

17. B

18. A

19. C

20. C

21. D (B is the 2<sup>nd</sup> best option)

22. C

23. C

24. B

25. B

26. B

27. C

28. D

29. C

30. Answer: D: I<sup>131</sup>

31. C

32. A

33. B

34. C

35. D

36. C

37. C

38. A

39. B

40. C



# NUMS - National University of Medical Sciences 2020 Paper

## PHYSICS

1. In motion of satellites necessary centripetal force is provided by
  - A) Gravitational force
  - B) Coulomb's force
  - C) Magnetic force
  - D) Nuclear force

[Force and Motion]
2. In ripple tank 40 waves pass through a certain point in one second. If the wavelength of the wave is 5 cm, then find the point speed of wave.
  - A) 2.7m/s
  - B) 3m/s
  - C) 200m/s
  - D) 2m/s

[Waves]
3. The product of frequency and time period is equal to:
  - A) 2
  - B) 3
  - C) 0
  - D) 1

[Rotational and circular motion]
4. Trough of a wave acts as:
  - A) Concave lens
  - B) Convex lens
  - C) Convex mirror
  - D) Plane mirror

[Waves]
5. In Doppler effect if listener moves towards a stationary source then:
  - A) Observed frequency is greater than original frequency
  - B) Observed frequency is less than original frequency
  - C) Observed frequency is equal to original frequency
  - D) Observed frequency is independent of original frequency

[Oscillation]
6. Refrigerator is an example of:
  - A) First law of thermodynamics
  - B) Second law of thermodynamic
  - C) Newton law of motion
  - D) Entropy

[Thermodynamics]
7. In a certain process 400J of heat energy is supplied to a system and at the same time 150 J of work is done by the system. the increase in internal energy of system is –
  - A) 150J
  - B) 300J
  - C) 250J
  - D) 500J

[Thermodynamics]
8. The rapid escape of air from a burst tyre is an example of:
  - A) Isothermal
  - B) Adiabatic
9. The bicycle pump work on the basis of:
  - A) 1<sup>st</sup> law of thermodynamic
  - B) 2<sup>nd</sup> law of thermodynamic
  - C) Law of conservation of energy
  - D) Law of entropy

[Thermodynamics]
10. Two positive point charges are placed 2m. electric potential at mid-point due to these charges will be;
  - A) Doubled
  - B) Halved
  - C) remains same (no effect)
  - D) cancel each other effect

[Electrostatics]
11. Which one of the following is the angle projection of a projectile if its range is equal to height?
  - A) 48°
  - B) 60°
  - C) 90°
  - D) 76°

[Force and motion]
12. The product of force and time is equal to:
  - A) Angular momentum
  - B) Force
  - C) Change in momentum
  - D) Velocity

[Work and Energy]
13. The time rate of change of linear momentum of a body is equal to:
  - A) Force
  - B) Momentum
  - C) Power
  - D) Acceleration

[Work and Energy]
14. A 10 N forces moves a body around a circular path of radius 50 cm what is work done completing one revolution?
  - A) 5J
  - B) Zero
  - C) 1.42 J
  - D) 500J

[Rotational and circular motion]
15. 3 kg falls from 20 m high platform. Find its fall speed from a height of 10m.
  - A) 196ms<sup>-1</sup>
  - B) 14ms<sup>-1</sup>
  - C) 10ms<sup>-1</sup>
  - D) 100ms<sup>-1</sup>

[Force and Motion]
16. The area under force – displacement graph gives us:
  - A) Displacement
  - B) Power
  - C) Work
  - D) Acceleration

[Force and Motion]
17. Kilowatt – hour is unit of?
  - A) Electric energy
  - B) Power
  - C) Momentum
  - D) Torque

- C) the value of first electron affinity is always positive  
D) The value of first electron affinity is always negative

[Chemical Bonding/s and p block elements]

36. The bond which is based on attractive force between oppositely charged ion is:

- A) covalent bond  
B) dative bond  
C) ionic bond  
D) metallic bond

[Chemical Bonding]

37. Which statement is incorrect regarding a chemical bond?

- A) bond is formed by the overlapping of half-filled orbitals  
B) bond is formed by the attraction of positive and negative ions  
C) bond is formed by the overlapping of 's' orbitals is strong  
D) bond is formed by the large sized atoms is strong

[Chemical Bonding/Theories of covalent bonds and shapes]

38. The carbonates of alkali metals are soluble in water except:

- A)  $K_2CO_3$   
B)  $Li_2CO_3$   
C)  $Na_2CO_3$   
D)  $Rb_2CO_3$

[s and p block elements]

39. The nitrides of alkaline earth metals hydrolyse with water to form

- A)  $NH_3$   
B)  $H_2$   
C)  $N_2$   
D)  $NO$

[s and p block elements]

40. The flame colour of Ca in flame test is:

- A) Orange red  
B) Golden yellow  
C) Red  
D) Pink

[s and p block elements]

41. Which of the following is the most stable metal carbonates?

- A)  $BaCO_3$   
B)  $MgCO_3$   
C)  $CaCO_3$   
D)  $SrCO_3$

[s and p block elements]

42. The binding energy of transition metal increase up to group

- A) IIB  
B) IV B  
C) IIIB  
D) VIB

[d and f block elements/Transition Elements]

43. Isomerism due to shifting of proton from atom to another in a same molecule is known as:

- A) Metamerism  
B) Tautomerism  
C) Position  
D) Functional

[Hydrocarbons/General Organic Chemistry]

44. Iso-butyl alcohol has following carbon attached to Hydroxy group:

- A) Tertiary  
B) Secondary  
C) Quaternary  
D) Primary

[Alcohols, phenols and Ethers]

45. Oxidation of alcohol gives

- A) Amine  
B) Alkane  
C) Aldehyde  
D) Alkyne

46. Butanone on oxidation with  $K_2CrO_7/H_2SO_4$  FORMS:

- A) Acetic acid  
B) Acetic acid & ethane  
C) Methane & propanoic acid  
D) Propanoic acid & methanoic acid

47. Hydrolysis of nitriles produces:

- A) Carboxylic acid  
B) Aldehydes  
C) Ketones  
D) Esters

48. Acetic anhydride is a product of acetic acid as a result of the following reaction:

- A) Dehydration  
B) Reduction  
C) Oxidation  
D) Esterification

49. Which of the following enzyme is raised in rickets?

- A) Lactic dehydrogenase  
B) LDH-I  
C) Phosphatase  
D) Alkaline phosphatase

[Macromolecules/biochemistry]

50. For a gaseous reaction, the increases in pressure will shift the equilibrium in a direction:

- A) Decreased concentration  
B) Increased concentration  
C) Decreased volume  
D) Increased volume

[Chemical Equilibrium/Acids]

51. Acidic buffer consists of

- A) Strong acid and salt of it with a weak base  
B) Weak acid and salt of it with a strong base  
C) Strong acid and salt of it with a strong base  
D) Weak acid and salt of it with a weak base

[Chemical Equilibrium/Acids, Bases and Salts]

52. The pH human blood is maintained between:

- A) 7.35 to 7.45  
B) 7.55 to 7.65  
C) 7.00 to 7.25  
D) 7.85 to 7.95

53. The breakdown of a substance with current is:

- A) Thermolysis  
B) Catalysis  
C) Electrolysis  
D) Photolysis

54. Which of the following is balanced redox equation?

- A)  $Na + Fe^{3+} \rightarrow Na^{+} + Fe$   
B)  $Zn + Ag^{+} \rightarrow Zn^{2+} + Ag$   
C)  $3Na + Fe^{3+} \rightarrow 3Na^{+} + Fe$   
D)  $2Zn + Ag^{+} \rightarrow 2Zn^{2+} + Ag$



55. Stronger is the oxidizing agent greater is the [Electrochemistry]  
 A) Oxidation potential B) Reduction potential  
 C) Redox potential D) EMF of cell
56. Type of bonding is sodium (Na) is: [Electrochemistry]  
 A) Metallic B) Ionic  
 C) Covalent D) Co-ordinate covalent
57. Which of the following halogens molecules has [s and p block elements/chemical bonding]  
 maximum bond energy?  
 A) F-F B) Cl-Cl  
 C) Br-Br D) I-I
58. Half atmospheric pressure is: [s and p block elements]  
 A) 400 torr B) 50622 Pa  
 C) 101.3 Pa D) 8.5 pounds
59. The values of S.T.P for 1 mole of any ideal gas is: [Gases]  
 A) 273.16k & 1 atm B) 0°C & 1 mm Hg  
 C) 273 16°C & 1 atm D) 0 K & 1 atm
60. The buffer solution is not formed for: [Gases]  
 A)  $\text{NH}_2\text{OH} + \text{NH}_4\text{Cl}$   
 B)  $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$   
 C)  $\text{C}_6\text{H}_5\text{COOH} + \text{C}_6\text{H}_5\text{COONa}$   
 D)  $\text{HCl} + \text{NaCl}$
61. In the reaction [Chemical Equilibrium/Acids, Bases and Salts]  
 $\text{H}_2 + \text{CO}_2 \leftrightarrow \text{H}_2\text{O} + \text{CO}$   
 The decrease in the concentration of  $\text{CO}_2$  will shift equilibrium:  
 A) Towards left B) Toward right  
 C) Nothing happens to the equilibrium  
 D) Equilibrium will shift towards both the direction
62. At equilibrium the concentration of reactants and product becomes: [Chemical Equilibrium]  
 A) Zero B) Equal  
 C) Constant D) Infinite
63. The effect of temperature on the rate of a reaction is given by: [Chemical Kinetics]  
 A) Henderson's equation  
 B) General gas equation  
 C) Arrhenius equation  
 D) Vander Waal's equation
64. The rate of reaction:  
 A) Increases as the reaction proceeds  
 B) Decreases as the reaction proceeds  
 C) Remains the same as the reaction proceeds  
 D) May decrease or increase as the reaction proceeds.
65. In a reversible reaction, catalyst lowers the [Chemical Kinetics]  
 activation energy of the:  
 A) Forward reaction B) Reverse reaction  
 C) Forward as well as reverse reaction  
 D) Forward reaction but increase that of the reverse reaction
66. 0.5 molar solution NaOH contains:  
 A) 40 g NaOH in one  $\text{dm}^3$   
 B) 80g NaOH in one  $\text{dm}^3$   
 C) 10g NaOH in one  $\text{dm}^3$   
 D) 20 g NaOH in one  $\text{dm}^3$
67. The expression  $PV=nRT$  represents the.  
 A) Dalton's law B) Avogadro's law  
 C) General gas equation  
 D) Vander Waal's equation
68. Pressure remaining constant at which temperature [Gases]  
 volume of gas will become twice to the volume at 0°C?  
 A) 546 °C B) 200 °C  
 C) 546 °C D) 273 °C
69. A graph between volume and temperature gives a straight line which cuts the temperature axis at:  
 A) 0°C B) 273°C  
 C) 546°C D) -273°C
70. What is not true for effusion of gases?  
 A) Movement of particles through small opening  
 B) Movement of particles for high pressure to low pressure  
 C) Movement of particles due to escaping tendency one by one  
 D) Movement of particles due to collision among themselves
71. Upon which factor vapour pressure is independent: [Gases]  
 A) Temperature  
 B) Intermolecular force  
 C) Density of liquid  
 D) Surface area of liquid
72. Solid water is expanded ——— times when it is compared with same volume of liquid water:  
 A) 9 B) 5  
 C) 6 D) 2
73. Molar heat of vaporization is the amount of heat required to convert one mole of:  
 A) A liquid into its vapours at its boiling point  
 B) Liquid into its vapours  
 C) Solid into vapours  
 D) Solid into liquids at its melting point

19. The general electronic configuration for alkali metals is?  
 A)  $ns^2$  B)  $ns^1$   
 C)  $ns^2np^1$  D)  $ns^2np^2$
20. Which of the following noble gas is found in the largest quantity in Earth's atmosphere?  
 A) Helium B) Neon  
 C) Argon D) Krypton
21. The most abundant metal in earth's crust is  
 A) Sodium B) Calcium  
 C) Aluminum D) Potassium
22. Which of the following forms a colorless reaction.  
 A)  $Cr^{3+}$  B)  $Co^{2+}$   
 C)  $Ca^{2+}$  D)  $Cu^{2+}$
23. Which of the following correctly defines polar covalent bond?  
 A) A bond between atoms with formal charges  
 B) A bond between atoms of different sizes  
 C) A bond between atoms with different electronegativities  
 D) A bond between atoms with different numbers of electrons
24. How many lone pairs of electrons will be present in the molecule  $CH_3-N=N=N$ ?  
 A) 1 B) 2  
 C) 3 D) 4
25. To form alcohols from carboxylic acids which of the following reducing agent is used?  
 A)  $LiAlH_4$  B)  $K_2Cr_2O_7$   
 C)  $H/P^+$  D)  $K_2Cr_2O_7/H_2SO_4$
26. On addition  $Br_2$  to  $CH_3-CH=CH_2$  the products formed are?  
 A)  $CH_3-CHBr-CH_2Br$   
 B)  $CH_3-CBr_2-CH_3$  and  $HBr$   
 C)  $CH_3-CBr=CHBr$  and  $HBr$   
 D)  $CH_3-CHBr-CH_2Br$  and  $HBr$
27. Which halide ion is the best nucleophile in dimethyl sulfoxide solution?  
 A) fluoride B) chloride  
 C) Bromide D) iodide
28. In the process of dehydrohalogenation a halogen is eliminated forming a double bond. The other product of this process is  
 A) Water B) Hydronium  
 C) Hydrogen D) Another halogen
29. The following compound represents



Aldehyde

- A) A ketone

- B) an amide  
 C) an aldehyde  
 D) a nitrile
30. What type of alcohol is this?



- A) Primary B) Secondary  
 C) Tertiary D) Quaternary
31. The main reason for alcohols having higher boiling points than alkanes of comparable molecular mass is due to  
 A) Hydrogen bonding  
 B) van der Waal's interaction  
 C) Ion-dipole interaction  
 D) Ionic bonding
32. All of the following compounds have higher boiling points than 1-butanol except?  
 A) butanoic acid B) 1-butanol  
 C) 2-butanol D) 1-butene
33. An imine cannot be formed when an amine reacts with  
 A) Benzaldehyde B) benzamide  
 C) Acetophenone D) benzophenone
34. The carbonyl group in an aldehyde is?  
 A) More reactive than a ketone  
 B) Less reactive than a ketone  
 C) Has the same reactivity as a ketone  
 D) none of these
35. The properties of Amines include  
 A)  $sp^3$  hybridized nitrogen compounds  
 B) Have a pyramidal arrangement of bonds  
 C) weak bases  
 D) all of the above
36. Azo compounds are  
 A) Products of the reaction of diazonium salts and phenols or anilines.  
 B) Generally two aromatic rings coupled by an azo group ( $-N=N-$ )  
 C) The color of the compound can be pH dependent  
 D) All of the above.
37. The most basic nitrogenous compound is?  
 A) Aniline  
 B) Cyclohexylamine  
 C) p-methoxyaniline  
 D) p-nitroaniline
38. Which of the following correctly gives the reactivity of acid derivatives with water?



- A) acid halide-ester-acid anhydride-amide  
 B) acid halide-acid anhydride-ester-amide  
 C) acid anhydride-amide-acid halide-ester  
 D) amide-ester-acid anhydride-acid halide
39. Acetic anhydride is less reactive toward a nucleophile than
- A) acetic acid  
 B) Ethyl acetate  
 C) Acetyl chloride  
 D) Acetonitrile
40. The least reactive type of compound to a nucleophilic attack on the carbonyl group is?
- A) an amide  
 B) an acid  
 C) an acyl chloride  
 D) an ester
41. Oligosaccharide and a polysaccharide differ in?
- A) Oligosaccharides contain one type of monomer while polysaccharides can contain many types of monomers.  
 B) Both are homogenous.  
 C) Both are heterogeneous.  
 D) Oligosaccharides are heterogeneous and polysaccharides are homogeneous
42. Which of the following is not true?
- A) Triglycerides are made, in part, from 1, 2, 3-propanetriol  
 B) Both fats and oils are triglycerides  
 C) Triglycerides are also made from fatty acids  
 D) Triglycerides are triethers
43. The main element responsible for algal growth in fresh water is
- A) Carbon  
 B) Lead  
 C) Nitrogen  
 D) oxygen
44. Based on molecular structure, which of these atmospheric components cannot contribute to global warming?
- A)  $\text{CO}_2$   
 B)  $\text{H}_2\text{O}$   
 C)  $\text{O}_2$   
 D)  $\text{CCl}_2\text{F}$
45. Separation of various components of cell is called
- A) Centrifugation  
 B) Dialysis  
 C) Homogenization  
 D) Fractionation
46. Which of these processes requires energy?
- A) Diffusion  
 B) Passive transport  
 C) Active transport  
 D) Osmosis
47. Uptake of liquid material inside the cell by invagination of membrane is called -
- A) Endocytosis  
 B) Exocytosis  
 C) Phagocytosis  
 D) Pinocytosis
48. Which of these not present in plasma membrane?
- A) Carbohydrates  
 B) lipids  
 C) Proteins  
 D) Nucleic acids
49. Which organelle protects the cells from osmotic lysis?
- A) Cell membrane  
 B) Cell wall  
 C) Cytoplasm  
 D) Nucleus
50. A network of channels that extends throughout cytoplasm is called -
- A) Golgi complex  
 B) Lysosome  
 C) Endoplasmic reticulum  
 D) Cytoplast
51. Ribosomes are usually attached to
- A) Golgi complex  
 B) Plasma membrane  
 C) Endoplasmic reticulum  
 D) Cytoplasm
52. The main function of Golgi complex is
- A) Secretion  
 B) Digestion  
 C) Endocytosis  
 D) Synthesis
53. Which of these is not bounded by a membrane?
- A) Golgi Complex  
 B) Vacuole  
 C) Centriole  
 D) Endoplasmic Reticulum
54. Cell shape and structure is maintained by
- A) Vacuole  
 B) Microtubules  
 C) Intermediate Filaments  
 D) Microfilaments
55. The bond present between two nucleotides is called bond
- A) Glycosides  
 B) Peptide  
 C) Phosphodiester  
 D) Hydrogen
56. Which of the following is a monosaccharide?
- A) Ribose  
 B) Amylose  
 C) Cellulose  
 D) Lactose
57. Which of these is most soluble in water?
- A) Galactose  
 B) Amylose  
 C) Glycogen  
 D) Cellulose
58. Animals store carbohydrates in the form of
- A) Starch  
 B) Amylopectin  
 C) Glycogen  
 D) Cellulose
59. Which of these is a lipid?
- A) Chitin  
 B) Rubber  
 C) Starch  
 D) Acylglycerol
60. When glycerol combines with fatty acids, is formed.
- A) Acylglycerols  
 B) Glycerine  
 C) Waxes  
 D) Isoprenoids
61. A special protein that protects the body against microorganisms is called
- A) Antibodies  
 B) Enzymes  
 C) Hemoglobin  
 D) Keratin

62. In sickle cell anemia the structure of hemoglobin protein is abnormal  
 A) Primary B) Secondary  
 C) Tertiary D) Quaternary
63. Which type of RNA is short (upto 90 nucleotides long)  
 A) mRNA B) tRNA  
 C) rRNA D) Sma
64. In DNA guanine pairs with  
 A) Adenine B) Uracil  
 C) Cytosine D) Thymine
65. Which of these is not related to hepatitis?  
 A) Swelling of lymph nodes  
 B) Fatigue  
 C) Abdominal pain  
 D) Jaundice
66. Viruses can be classified on the basis of  
 A) Host B) Genome  
 C) Shape D) All of these
67. Chemotherapeutic chemicals used to kill bacteria inside the body are called  
 A) Sterilants B) Disinfectants  
 C) Antiseptics D) Antibiotics
68. Which of these results in oxidation of chemicals of microbe and kills them?  
 A) Dry heat B) Moist heat  
 C) Chemicals D) Antibiotics
69. Which of these is not a parasite?  
 A) Trypanosoma B) Entamoeba  
 C) Anopheles D) Plasmodium
70. Histoplasmosis is a disease of  
 A) Heart B) Skin  
 C) Lungs D) Digestive system
70. Cleavage divisions are in deuterostomes.  
 A) Spiral B) Radial  
 C) Discoidal D) Epimeral
71. Members of phylum hemichordata and chordata are  
 A) Coelomates  
 B) Pseudocoelomates  
 C) Acoelomates  
 D) Blastocoelomate
72. The parasitic Platyhelminthes are usually common in  
 A) Tropics B) Deserts  
 C) Polar ice caps D) Cold climates
73. The system of flatworms is simplified as an adaptation for parasitic mode of life.  
 A) Reproductive B) Digestive  
 C) Excretory D) Nervous
74. *Ascaris lumbricoides* belongs to the phylum  
 A) Platyhelminthes B) Nematoda  
 C) Mollusc D) Arthropoda
75. The function of \_\_\_\_\_ in gastric secretions is protection of stomach walls.  
 A) Water B) HCl  
 C) Pepsinogen D) Mucous
76. Stomach produces more gastric juice if there is  
 A) Water B) Protein  
 C) Carbohydrates D) Lipids
77. Which of these is not a component of saliva produced in mouth?  
 A) Water and mucus B) Dehydrogenase  
 C) Ptyalin D) Sodium bicarbonate
78. Liver secretes bile into  
 A) Ileum B) Duodenum  
 C) Stomach D) Jejunum
79. When oxygen tension is 115mm of mercury then hemoglobin saturation is  
 A) 100 B) 98  
 C) 78 D) 68
80. Breathing rate in man at rest is \_\_\_\_\_ times per  
 A) 10 to 15 B) 15 to 20  
 C) 20 to 25 D) 25 to 30
81. One cardiac cycle is completed in  
 A) 0.3 B) 0.5  
 C) 0.8 D) 1.2
82. Coronary artery supplies blood to \_\_\_\_\_  
 A) Skeletal muscles B) Cardiac muscles  
 C) Aorta D) Truncus arteriosus
83. Which part of brain monitors body temperature?  
 A) Thalamus B) Pons  
 C) Hypothalamus D) Amygdala
84. Urea is produced in  
 A) Ureter B) Muscles  
 C) Liver D) Kidneys
85. A diluted solution compared to cell concentration is termed as \_\_\_\_\_  
 A) Hypertonic B) Hypotonic  
 C) Isotonic D) Paratonic
86. The protein filament which binds calcium:  
 A) Actin B) Myosin  
 C) Tropomyosin D) Tropomyosin
87. The fusion of four posterior pelvic vertebrae is  
 A) Cervical B) Coccyx  
 C) Lumbar D) Sacrum
88. Number of cervical vertebrae in a male camel (mammal):  
 A) 7 B) 11  
 C) Varies with age  
 D) Varies with size of neck



18. The food we eat in one day has about the same energy as:  
 A) 0.33 liter of petrol  
 B) 1 liter of petrol  
 C) 0.5 liter of petrol  
 D) 2 liter of petrol  
 [Work and Energy]
19. One complete circle is equal to:  
 A) 2 radian  
 B) 3 radian  
 C) 5 radian  
 D) 6 radian  
 [Work and Energy]
20. Red light is used in photographic dark room because of:  
 A) More frequency less wavelength  
 B) Less frequency less wavelength  
 C) Less frequency more wavelength  
 D) More frequency more wavelength  
 [Rotational and circular motion]
21. For gaining an atomic spectrum, an evacuated glass tube is filled with:  
 A) Neon  
 B) Hydrogen  
 C) Carbon dioxide  
 D) Sulphur dioxide  
 [Waves]
22. During production of x-ray the cathode and anode are enclosed inside an evacuated glass chamber and high DC voltage of the order of:  
 A) 1000 V is maintained  
 B) 10,000 V is maintained  
 C) 25,000 V is maintained  
 D) 50,000 V is maintained  
 [Atomic Spectra]
23. Half-life of iodine -131 is 8 days. If 200mg is present initially how much iodine is left behind after 2 half-lives.  
 A) 10 mg  
 B) 50 mg  
 C) 2.5 mg  
 D) 1.25 mg  
 [Current Electricity]
24.  $4.5 \times 10^9$  year is the half-life of:  
 A)  $U^{234}$   
 B)  $U^{235}$   
 C)  $U^{238}$   
 D)  $C^{14}$   
 [Nuclear Physics]
25. When a charge 'Q' on capacitor is doubled then energy stored 'U' will:  
 A) 2U  
 B) 3U  
 C) U/2  
 D) 4U  
 [Nuclear Physics]
26. By increasing area of the plates and decreasing distance between them the capacitance of capacitor:  
 A) Increases  
 B) Decreases  
 C) Remains unchanged  
 D) Depending upon temperature  
 [Current Electricity]
27. If we double the separation between two charges, then coulomb's force will become?  
 A) Doubled  
 B) Half  
 C) 4 times  
 D)  $\frac{1}{4}$   
 [Electrostatics]
28. The power of an electric bulb is 100 W. It is connected to 110V power supply. The resistance of electric bulb will be?  
 A) 11 ohm  
 B) 121 ohm  
 C) 20 ohm  
 D) 200 ohm  
 [Current Electricity]
29. Terminal voltage ' $V_T$ ' of the battery is greater than e.m.f of the battery when?  
 A) Battery is charging  
 B) Battery is discharging  
 C) Battery is connected with R  
 D) Battery is connected with voltmeter
30. The temperature coefficient of semiconductor is negative because:  
 A) Resistance increases with increase of temperature  
 B) Resistance decreases with increase of temperature  
 C) Resistance decreases with decrease of temperature  
 D) Resistance remain same with increase of temperature  
 [Current Electricity]
31. If length of the wire becomes two times to its original value and area becomes one half to its original value, then resistance of the wire becomes:  
 A) Double  
 B) Four times  
 C) One half  
 D) One fourth  
 [Current Electricity]
32. The unit is resistivity is:  
 A) Ohm  
 B) Ohmmeter  
 C) Ohm/meter  
 D) Meter/ohm  
 [Current Electricity]
33. 1 kilowatt hour =  
 A)  $1.6 \times 10^{10}$  J  
 B)  $3.6 \times 10^6$  J  
 C)  $9.1 \times 10^3$  J  
 D)  $1.67 \times 10^{-27}$  J
34. It is a null type resistance device for measuring potential differences:  
 A) Galvanometer  
 B) Ohmmeter  
 C) Ammeter  
 D) Potentiometer  
 [Current Electricity]

## CHEMISTRY

35. Which statement is true about electron affinity?

A) the value of electron affinity is always positive

B) the value of electron affinity is always negative

NMDCAT in my Pocket (Our YouTube Channel)

74. Many elements have fractional atomic masses this because:
- Mass of atom is itself fractional
  - Atomic masses are average masses of isobars
  - Atomic masses are average masses of isotopes
  - Atomic masses are average masses of isotopes proportional of their abundance
75. Mass of 1 molecule of  $O_2$  is:
- $6.02 \times 10^{23}$  g/32
  - $32/6.02 \times 10^{23}$  g
  - 32 g
  - 0.32 g
- [Stoichiometry]
76. The number of moles of  $CO_2$  which contain 8.0g of oxygen are:
- 1.0
  - 4.50
  - 0.50
  - 0.25
- [Stoichiometry]
77. Identify the correct option with same empirical formula for both compounds:
- $H_2O$  &  $H_2O_2$
  - $C_6H_{12}$  &  $C_6H_6$
  - $H_2S_2O_3$  &  $H_2SO_4$
  - $C_6H_{12}O_6$  &  $CH_3COOH$
- [Stoichiometry]
78. 1 mole of any substance contain ——— particles
- $6.02 \times 10^{23}$
  - $6.02 \times 10^{24}$
  - $6.02 \times 10^{22}$
  - $3.01 \times 10^{23}$
- [Stoichiometry]
79. What are the Avogadro's number of particles in 0.25 moles of  $CO_2$ ?
- $6.022 \times 10^7$
  - $1.505 \times 10^{23}$
  - $2.00 \times 10^{23}$
  - $1.505 \times 10^{15}$
- [Stoichiometry]
80. The charge on one kg of electron is:
- $1.7588 \times 10^{11}$  C
  - $1.65 \times 10^{10}$  C
  - $9.1095 \times 10^{21}$  C
  - $7.9 \times 10^{25}$  C
- [Stoichiometry]
81. At transition temperature of crystalline solid substance exists
- In most stable geometrical form
  - Solid and liquid state
  - In dynamic equilibrium between two crystalline form
  - In one solid geometrical form only
82. Some substance lacks definite heats of fusion these substances are:

- isomorphs
  - polymorphs
  - amorphous solids
  - crystalline solid
83. Thermal conductivity of metals is due to
- layered structure of metals
  - freely moving electrons
  - loosely held metals atoms
  - vibrational movements of metals
84. Ice floats on the surface of water due to
- large bond length
  - cubic structure of ice
  - weak intermolecular force
  - empty spaces in the structure of ice
85. When number of moles of reactants and products are equal in reversible reactions, which parameter would not affect at equilibrium?
- Temperature
  - Pressure
  - Volume
  - Catalyst
86. By which of the following factors equilibrium state is attained earlier?
- Temperature
  - pressure
  - Concentration
  - catalyst
87. Which of the following fundamental particles have same mass/kg?
- Electron neutrino
  - Electron proton
  - Proton neutrino
  - Neutron proton
88. The lightest positive rays obtained is form?
- Hydrogen gas
  - Helium
  - Neon
  - Air
89. The amount of energy associated with quantum of radiation is directly proportional to:
- Photon
  - wavelength
  - Frequency
  - velocity
90. X-ray are defined as:
- Electromagnetic radiations of high mass number
  - Electromagnetic radiations of very high frequency
  - Electromagnetic radiations of high wavelength
  - Electromagnetic radiations of high energy
91. Which of the following orbital will be filled first than 4p?
- 4s
  - 2p
  - 3d
  - 1s
92. Maximum ——— electrons can be placed in one orbital:
- 1
  - 2
  - 3
  - 4
93. Mass of electrons in a.m.u is:
- 1.0073
  - 1.0087
  - $5.485 \times 10^{-4}$
  - $9.1 \times 10^{31}$



94. Identify the error and choose the correct option  
The rehearsal session started and we have little times to spare for other activities
- A) The rehearsal session started and we have little time to spare for other activities  
B) The rehearsal session started, and we little time to spare for other activities  
C) The rehearsal session starts and we have little times to spare for other activities  
D) We are little time to spare for other activities the rehearsals session starts
95. Fill in the blanks with appropriate option:  
Lions, like any other carnivore, \_\_\_\_\_ on meat
- A) Live B) Lives  
C) Does live D) Living
96. Fill in the blanks with appropriate option  
The cattle \_\_\_\_\_ away the crops.
- A) Has eaten B) Is eating  
C) Have eaten D) Have been eating
97. The word 'LABYRINTH' means:
- A) Maze B) Heap  
C) Hive D) Knack
98. Ahmed carried out his duty according to instructions.
- A) Too B) To  
C) Under D) An
99. Identify the errors and choose the correct option
- A) The first space travels was Dennis Tito from the united states  
B) The first space traveller was Dennis Tito from united states  
C) The first space traveller was Dennis Tito from united states
100. Select the right statement
- A) He opened the square red wooden box  
B) He opened the red square wooden box  
C) He opened the wooden red square box  
D) He opened the red wooden square box
101. Fill in the blanks. I can't walk—
- A) Farther B) Far  
C) Further D) Away
102. Can you tell this fact \_\_\_\_\_ his face?
- A) To B) On  
C) Upon D) At
103. Choose the correct option
- A) The three Musketeers was written by Dumas  
B) The three Musketeers were written by Dumas  
C) The three Musketeers has written by Dumas  
D) The three Musketeers have written by Dumas
104. They have painted their house purple the sentence is an example of:
- A) Mono transitive  
B) Dis transitive  
C) Complex transitive  
D) Reflexive transitive
105. Selected correct option:  
He was killed \_\_\_\_\_ robbers \_\_\_\_\_ a hatchet.
- A) From ,with B) By at  
C) Through for D) By with
106. Find out antonym of 'Mumbled'
- A) Unprovoked B) Quiver  
C) Loud D) Rarely

## BIOLOGY

107. Negative feedback mechanism is the characteristic of which class?
- A) Class fish B) Class amphibian  
C) Class reptilian D) Class Mammalia  
[Homeostasis]
108. The function of papillary muscles is to:
- A) Move blood from semilunar valve into pulmonary vein  
B) Prevent the backward flow of blood from the ventricle  
C) Push the blood from right atrium to left atrium  
D) Push the blood from left atrium to aorta  
[Circulation]
109. Choose the correct pathway for the flow of blood:
- A) Arterioles—metarterioles—thoroughfare channel—capillaries  
B) Arterioles—thoroughfare channel—metarterioles—capillaries  
C) Thoroughfare channel—arterioles—capillaries—metarterioles  
D) Metarterioles—arterioles—thoroughfare channels—capillaries  
[Circulation]
110. Intrinsic factor is secreted by:
- A) Pancreas B) Liver  
C) Stomach D) Duodenum  
[Digestion]
111. Gaseous exchange in plants takes place through the:
- A) Stomata B) Mesophyll  
C) Endoderm D) Xylem  
[Froms and Functions in plants]

112. Translocation of organic solutes in plants take place through:

- A) Companion cell  
B) Fibres  
C) Sieve tube  
D) Vessel

[Froms and Functions in plants]

113. The only vein in the human body carrying oxygenated blood is:

- A) Femoral  
B) Pulmonary  
C) Renal  
D) Iliac

[Circulation]

114. The cell which play very important role in developing immunity are

- A) Monocytes  
B) Neutrophils  
C) Lymphocytes  
D) Thrombocytes

[Immunity]

115. Which of the following blood vessels have the highest pressure of blood?

- A) Aorta  
B) Pulmonary arteries  
C) Pulmonary veins  
D) Vena cava

[Circulation]

116. Autoimmune diseases act at the principal of?

- A) Self against antigens  
B) Antigen against self  
C) Self against self  
D) Antigen self-destroyed

[Immunity]

117. NAD is an example of ———:

- A) Mononucleotide  
B) Dinucleotide  
C) Tri nucleotide  
D) Tetra nucleotide

[Biological molecules]

118. What would be the number of Nucleotides for a protein molecule of about 142 amino acids

- A) 430  
B) 142  
C) 426  
D) 460

[Bioenergetics]

119. The basic structural framework of all types of membranes are:

- A) Glycolipids  
B) Glycoproteins  
C) Lipoproteins  
D) Nucleoproteins

[Cell Structure and function]

120. Non protein but inorganic detachable co-factor is called —

- A) Activator  
B) Prosthetic group  
C) Co-enzymes  
D) Apo-enzymes

[Enzymes]

121. Cyanides are potent poisons of living organism and can kill by inhibiting — essential for cellular respiration:

- A) Cytochromes oxidases  
B) Dehydrogenases  
C) Hydrolases

122. During feedback inhibition which of the following structural part of enzyme is involved

- A) Active site  
B) Binding site  
C) Catalytic site  
D) Allosteric site

[Homeostasis]

123. Which of the following enzymes does NOT need co-factor?

- A) Hexokinase  
B) Pepsin  
C) Alcohol dehydrogenases  
D) Carbonic anhydrase

[Enzymes]

124. If another molecules having a shapes very similar to the enzyme's substrate binds to its active site would then — the enzymes's function:

- A) Fasten  
B) Inhibit  
C) Reverse  
D) Decrease

[Enzymes]

125. Myofibrils within muscle fibres contain thick and thin filaments made up of — and — respectively:

- A) Myosin and actin  
B) Globulin and albumin  
C) Troponin and Tropomyosin  
D) Fibrin and fibrinogen

[Support &amp; momentum]

126. Vertebrae of the neck are called:

- A) Coccygeal vertebrae  
B) Cervical vertebrae  
C) Sacral vertebrae  
D) Lumbar vertebrae

[Support &amp; momentum]

127. Which vertebrae together are called sacral vertebrae?

- A) Coccygeal vertebrae  
B) Sacral and lumbar  
C) Sacral and coccygeal  
D) Sacral and thoracic

[Support and Movement]

128. The incorrect option about nerves is

- A) 33 pairs  
B) Mostly mixed nerves  
C) Dorsal root contains sensory neurons  
D) Ventral root contains motor neurons

[Nervous Coordination]

129. Within the chromosomes each chromatid contains — DNA molecules:

- A) One  
B) Two  
C) Three  
D) Half

[Chromosome &amp; DNA]



130. Modification in the organization of the basic pentadactyle limb structure found in vertebrates provides good evidence for the principle of:  
 A) Adaptive radiation  
 B) Convergent evolution  
 C) Genetic drift  
 D) Inheritance of acquired characters  
 [Evolution]
131. Which one of the following is a genetic disorder in which abnormally thick mucus is produced in the lungs and other parts of the body?  
 A) Lungs cancer  
 B) Chronic bronchitis  
 C) Cystic fibrosis  
 D) Emphysema  
 [Respiration]
132. Oxygen released into the atmosphere comes from:  
 A)  $\text{CO}_2$   
 B)  $\text{H}_2\text{O}$   
 C)  $\text{C}_6\text{H}_{12}\text{O}_6$   
 D)  $\text{CO}_2$  and  $\text{H}_2\text{O}$   
 [Froms and Fuctions of plants]
133. End product of glycolysis in yeast is:  
 A) Ethanol and carbon dioxide  
 B) Lactate  
 C) Pyruvate  
 D) Acetyl Co. A  
 [Bioenergetics]
134. First infection disease against which effective method of prevention developed as a ----  
 A) Bacterial disease  
 B) Viral disease  
 C) Protozoan disease  
 D) Viroid disease  
 [A Cellular Life]
135. ----- infection is caused by a viroid  
 A) Hepatitis A  
 B) Hepatitis D  
 C) Mad cow disease  
 D) Mysterious brain infection  
 [A Cellular Life]
136. Numerous opportunistic diseases might attack a person suffering from which of the following disease?  
 A) Measles  
 B) Influenza  
 C) Hepatitis A  
 D) AIDS  
 [A Cellular Life]
137. A combination of alpha interferon and ribavirin is used for the treatment of hepatitis  
 A) B  
 B) A  
 C) D  
 D) C  
 [A Cellular Life]
138. Cysts are not resistant to ----- but spores are  
 A) Light  
 B) Desiccation  
 C) pH  
 D) heat  
 [Prokaryotes]
139. In which phase of bacterial growth they divide at exponential rate?
- A) Lag phase  
 B) Log phase  
 C) Stationary phase  
 D) Decline phase  
 [Prokaryotes]
140. Select a method which cause the oxidation of chemical constituent of a bacterial cell:  
 A) Steam  
 B) Dry heat  
 C) Filtration  
 D) Radiation  
 [Prokaryotes]
141. How does chemosynthesis differ from photosynthesis?  
 A) Source of energy  
 B) Production of organic compound  
 C) Reduction of  $\text{CO}_2$   
 D) Carried out by bacteria  
 [Bioenergetics]
142. Which one is different with respect to its modes of locomotion?  
 A) Amoeba  
 B) Paramecium  
 C) Forams  
 D) Radiolarians  
 [Protists and Fungi]
143. Aspergilosis is a fungal infection and occurs only in ----  
 A) Male  
 B) Female  
 C) AIDA patient  
 D) Athletes  
 [Protists and Fungi]
144. Select a sessile zoo flagellate:  
 A) Trichonympha  
 B) Trypanosome  
 C) Coano flagellate  
 D) Euglena  
 [Prokaryotes]
145. Many ----- expel amount of water by special structures called contractile vacuoles  
 A) Protozoa  
 B) Porifera  
 C) Echinoderm  
 D) Fish  
 [Protists and Fungi]
146. Chlorophyta are considered to be closest to plants but do not resemble plants in having:  
 A) Chlorophyll a and b  
 B) Starch as stored food  
 C) Cellulose cell wall  
 D) Multicellular sex organs  
 [Protists and Fungi]
147. Asexual spores of fungi are called:  
 A) Conidiospores  
 B) Zygosporos  
 C) Ascospores  
 D) Basidiospores  
 [Protists and Fungi]
148. Which characteristic led to the evolution of seed?  
 A) Heterogamous condition  
 B) Development of heterospory  
 C) Embryo formation  
 D) Protection of reproductive cell  
 [Forms and Functions in plants]

149. The term which is not related to the process of evolution of leaf:

- A) Overtopping  
B) Planation  
C) Heterospory  
D) Fusion webbing

[Diversity among Plants]

150. The most successfully land adapting plants are:

- A) Mosses  
B) Ferns  
C) Gymnosperms  
D) Angiosperms

[Diversity among Plants]

151. Excretory system consisting of protonephridial tubes are present in phylum:

- A) Porifera  
B) Annelida  
C) Platyhelminthes  
D) Cnidarian

[Diversity among Plants]

152. Fibers of extracellular matrix are attached to — in plasma membrane:

- A) Phospholipids  
B) Carbohydrates  
C) Glycolipids  
D) Proteins

[Biological Molecules]

153. organelles involve in the synthesis of plants cell wall

- A) Endoplasmic reticulum  
B) Golgi complex  
C) Lysosomes  
D) Peroxisomes

[Biological Molecules]

154. Select the pair of organs which contains a large number of mitochondria:

- A) Stomach & liver  
B) Muscle & stomach  
C) Heart & liver  
D) Liver & muscle

[Digestion]

155. Most abundant organic compounds in mammalian cell

- A) Water  
B) Lipids  
C) Carbohydrates  
D) Proteins

[Biological Molecules]

156. Second most abundant bio elements in human body is:

- A) Oxygen  
B) carbon  
C) Hydrogen  
D) nitrogen

[Biological Molecules]

157. lecithin is formed by combining phosphatidic acid with —

- A) serine  
B) choline  
C) inositol  
D) ethanolamine

158. Which organ is called as the body's thermostat?

- A) Pituitary gland  
B) Kidneys  
C) Hypothalamus  
D) Adrenal gland

[Nervous Coordination]

159. The uptake of sodium in the ascending limb of loop of henle is controlled by

- A) Aldosterone  
B) ADH  
C) Glucocorticoid  
D) Thyroxin

[Homeostasis]

160. The multinucleated mass of the bone forming cell is called:

- A) Osteoclasts  
B) Osteoblasts  
C) Osteogenes  
D) Osteocytes

[Support and Movement]

161. Chief material present in the cell walls of fungal and prokaryotic cell are

- A) Protein  
B) Lipids  
C) Polysaccharides  
D) Phospholipids

[Prokaryotes]

162. Which type of leucoplasts store lipids?

- A) Amyloplast  
B) Elaioplast  
C) Proteinoplast  
D) Fuoplast

[Biological Molecules]

163. Which type of movement through cell membrane not energy consuming process?

- A) Endocytosis  
B) Exocytosis  
C) Active transport  
D) Osmosis

[Homeostasis]

164. Cholesterol molecules in plasma membrane are present —

- A) Outer membrane of phospholipid  
B) Inner membrane of phospholipid  
C) Both layer of phospholipid  
D) Between bilayers of phospholipid

[Biological Molecules]



## KEY and Hints

## NUMS and National MDCAT by Ali Sudais

1. **A: Hint:** This centripetal force is supplied by gravity the force that universally acts at a distance between any two objects that have mass. Were it not for this force, the satellite in motion would continue in motion at the same speed and in the same direction?
2. **D: Hint:**  $v = f\lambda$   
 $v = 40 \times 5 \times 10^2$   
 $v = 200 \times 10^2 = 2 \times 10^2 \times 10^2$   
 $v = 2 \text{ m/s}$
3. **D: Hint:** As frequency and Time period are reciprocal of each other. Thus  
 Product =  $f \times T = f \times 1/f = 1$
4. **A: Hint:** Trough is the above portion of a wave acts like a concave lens.
5. **A: Hint:** As when the distance between the listener and the source decreases, frequency increases.
6. **B: Hint:** According to 2<sup>nd</sup> Law of Thermodynamics, heat always transfer from hotter body to cooler body.
7. **C: Hint:**  $\Delta Q = \Delta U + \Delta W$   
 $400 = \Delta U + 150$   
 $400 - 150 = \Delta U$   
 $\Delta U = 250 \text{ J}$
8. **B: Hint:** An adiabatic process occurs without transferring heat or mass between a thermodynamic system and its surroundings. Unlike an isothermal process, an adiabatic process transfers energy to the surroundings only as work.
9. **A: Hint:** The first law of thermodynamics is a version of the law of conservation of energy, adapted for thermodynamic processes, distinguishing two kinds of transfer of energy, as heat and as thermodynamic work, and relating them to a function of a body's state, called Internal energy.
10. **A: Hint:** The electric potential "V" at the mid-point of two charges at distance  $r = 2\text{m}$  will be doubled than the electric potential "V" at the distance =  $1\text{m}$  between the charges.
11. **D: Hint:** In projectile thrown at angle  $\theta$  Range R and maximum height H are given as:  
 Range,  $R = \frac{v^2(\sin 2\theta)}{g} = \frac{v^2 2\sin\theta\cos\theta}{g}$   
 Maximum Height,  $H = \frac{v^2 \sin^2\theta}{2g}$   
 Given:  $H=R$   
 $\frac{v^2 \sin^2\theta}{2g} = \frac{v^2 2\sin\theta\cos\theta}{g}$   
 $4\cos\theta = \sin\theta$   
 $\tan\theta = 4 \rightarrow \theta = \tan^{-1} 4$   
 $\theta = 76^\circ$
12. **C: Hint:** As  $P = \frac{\Delta P}{\Delta t}$  thus  $\Delta P = P \times \Delta t$
13. **A: Hint:** According to the relation;
14. **B: Hint:** As in one revolution, there are total  $360^\circ$  having the same initial and final point thus having zero displacement  
 $W = 1 \times d = 10 \times 0 = 0 \text{ J}$
15. **B: Hint:** As this is a free fall motion, so  
 $v = \sqrt{2 \times g \times h} = \sqrt{2 \times 9.8 \times 10}$   
 $v = \sqrt{196}$ ,  $v = 14 \text{ m/s}$
16. **C: Hint:** As work is the product of Force and displacement thus area under force-displacement graph is equal to work done.
17. **A: Hint:** As you know that;  
 $P = W/t$  thus  $W = P \times t$   
 Work and Energy have same SI unit thus  
 $W = \text{kilowatt hour}$ ; this is the unit of electrical work or electrical energy.
18. **A**
19. **D: Hint:** As 1 revolution =  $360^\circ = 2\pi$  radians  
 Thus  $2\pi$  radians =  $2 \times 3.14 = 6.28$  radians  
 Approximately 1 revolution  $\approx 6$  radians
20. **C: Hint:** Red has the maximum wavelength and as frequency and wavelength are inversely related thus minimum frequency.
21. **B**
22. **A: Hint:** The voltage or potential difference of 1000 V is maintained because as the electrical current flows through the tube from cathode to anode, the electrons undergo an energy loss, which results in the generation of x-radiation.
23. **B: Hint:** As after 1<sup>st</sup> half-life, Iodine-131 will decay up-to 100 mg then after 2<sup>nd</sup> half-life 50mg will be left.
24. **C: Hint:**  $U^{238}$  has the half-life of  $4.5 \times 10^9$  year, it decays to form Thorium-234.
25. **D: Hint:** As  $Q = CV$ , and  $E = Q \times V$   
 $E = Q^2/C$ , thus  $E \propto Q^2$   
 When  $Q' = 2Q$  then Energy will become quadrupled (4 times).
26. **A: Hint:** As  $C = \frac{A\epsilon_0}{d}$   
 Thus  $C \propto A$  and  $C \propto 1/d$   
 Decreasing the distance increases the capacitance of capacitor.  
 Increasing the area of the plates increases the capacitance of capacitor.
27. **D: Hint:**  $F = kq_1 q_2/r^2$   
 Thus  $F \propto 1/r^2$   
 If  $r = 2r$  then  $r^2 = 4r^2$   
 Thus Coulomb's force will become one fourth.
28. **B: Hint:**  $P = IV$   
 Now According to Ohm's Law:  $V = IR$   
 Thus  $I = V/R$

- so  $P = V R \times V = V^2 R$   
 $P = V^2/R \Rightarrow R = V^2/P = (110)^2/100$   
 $R = 12100/100 = 121 \text{ Ohm}$
29. **A: Hint:**  $V_T = E + IR$  so  $V_T > E$   
 During charging,  $V_T$  is greater than  $E$ .  
 While during discharging  $V_T$  is less than  $E$  as per this equation:  $V_T = E - IR$
30. **B: Hint:** Negative temperature coefficient means resistance decreases with increase in temperature while positive temperature coefficient means resistance increases with increase in temperature.
31. **B: Hint:** As  $R = \rho l/A$  so  $R \propto l$  and  $R \propto 1/A$   
 Doubling the length will double the resistance and if area is halved, resistance will double so Resistance will become four times if length is doubled and area is halved.
32. **B: Hint:**  $\rho = RA/l = \text{Ohm m}/\text{m} = \text{Ohm meter}$
33. **B: Hint:** Both kilowatt and Joule are the units of Electrical energy thus  
 1 kilowatt hour =  $3.6 \times 10^6 \text{ J}$
34. **D: Hint:** Potentiometer is used to measure potential differences.
35. **D: Hint:** Energy is released during electron affinity therefore, EA is negative always.
36. **C: Hint:** Ionic bond is formed when two opposite charged ions come close to each other.
37. **D: Hint:** D is incorrect because bond formed by the large sized atoms is weaker
38. **B: Hint:** Lithium carbonates don't dissolve in water and the rest of all do.
39. **A: Hint:** it gives ammonia with hydrolysis.
40. **A: Hint:** Orange red color is given with flame test
41. **A: Hint:** Stability increases down the group of carbonates.
42. **B: Hint:** it creases upto IVB and then decreases
43. **B**
44. **D: Hint:** OII is attached to the carbon which is primary as it is attached to one carbon on one side while OH on the other side, therefore, the is also called primary alcohol
68. D | 69. D | 70. D | 71. D | 72. A | 73. A | 74. D
81. **C: Hint:** there is dynamic equilibrium at transition temperature
82. **C: Hint:** amorphous solids have no definite M.P., heats of fusion etc.
83. **B**
84. **D: Hint:** empty spaces make the ice less dense

45. **C: Hint:** For such questions, you must read the book of organic chemistry in Ali Series book of Dr. Ali Sudais, "Chemistry in My Pocket"
46. **A: Hint:** In Organic chemistry part of Ali Series book "Chemistry in my Pocket" a chart is given to see all the products of oxidation and reduction in very simple way.
47. **A: Hint:** when  $-\text{CN}$  is present in a molecule, it goes acid on hydrolysis.
48. **A: Hint:** Alkaline phosphatase
49. **D: Hint:** Alkaline phosphatase
50. **A: Hint:** the equilibrium shifts to the direction of the concentration from more concentration.
51. **B**
52. **B: Hint:** 7.35 to 7.45
53. **C: Hint:** Electro mean electricity and lysis for breaking.
54. **C**
55. **B: Hint:** reduction potential tells us about the ability to reduce which is an oxidizing agent. more the reduction potential means stronger the oxidizing agent.
56. **A: Hint:** Sodium is metal and metals also follow metallic bonding with each other.
57. **B: Hint:** Chlorine has more than bromine, which has more than fluorine and the minimum bond energy is of Iodine
58. **B**
59. **A: Hint:** A is standard value.
60. **D: Hint:** HCl is a strong acid while NaCl is a salt of strong acid and strong base. Therefore, it can't be a buffer.
61. **A: Hint:** Reactions shift to the side where the concentration decreases.
62. **C**
63. **C**
64. **B: Hint:** concentration of the reactants decreases with time and therefore, the reaction rate decreases.
65. **C**
66. **B: Hint:** 1 molar contains 40 g. therefore, 0.5 molar contains 20g.
67. **C: Hint:** General gas equation or ideal gas equation.
75. B | 76. D | 77. D | 78. A | 79. B | 80. A
85. **B: Hint:** when the pressure is increased, the reaction doesn't shift to any side.
86. **D: Hint:** Catalysts increase the rate of reactions and hence it causes to attain equilibrium sooner.
87. **D: Hint:** neutron and proton.
88. **A: Hint:** hydrogen.
89. **C: Hint:** Frequency



90. D: Hint: frequency is high of EMR, so the D is the definition.

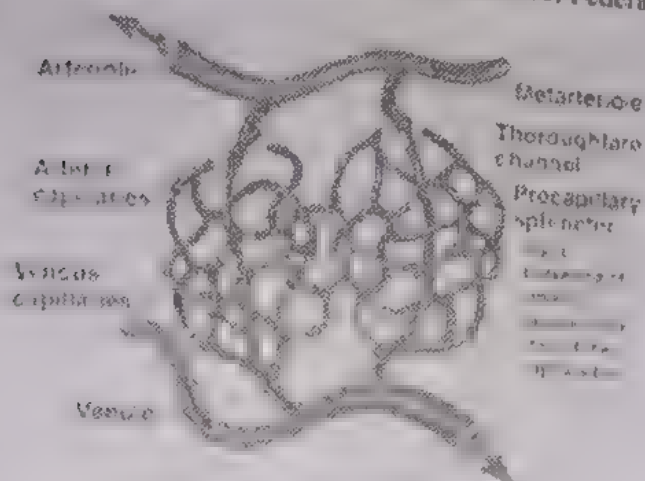
This question is present in almost every book of the country.

93. C | 94. A | 95. A | 96. C | 97. A | 98. B | 99. D

107. D: Hint: negative feed back Mammela

108. B: Hint: tricuspid valve and mitral valve

109. A: Hint: this is the series Reference: Federal book



110. C: Hint: gastric intrinsic factor

111. A: Hint: stomata present in all the books

112. C: Hint: sieve tubes

113. B: Hint: pulmonary vein

114. C: Hint: Lymphocytes

115. A: Hint: aorta Highest blood pressure

Reference: Present in almost all the books of Pakistan

116. C: Hint: self against self self-antigens and non Self-antigens are present in the body Self is

135. D | 136. B | 137. D | 138. B | 139. B | 140. B | 141. D | 142. B | 143. C | 144. A | 145. A

146. D: Hint: given in Punjab. Chlorophyte is also called green alga Rest of all are present in all the plants and organisms excepted

147. A

148. B

149. C

150. D

151. C

152. D: Hint: it is attached to proteins only  
Reference: present in almost all the books especially federal and Punjab.

153. B: Hint: common in all the books of all the Provinces.

154. D: Hint: Liver has more activity than stomach so more mitochondria and more energy.

155. D: Hint: Proteins. Present in Punjab, federal Percentage is also given in the Punjab books.

91. C: Hint: 4s, 3d, 4p

92. B: Hint: An orbital can occupy only two electrons or it can place maximum of two electrons

100. A | 101. C | 102. A | 103. A | 104. C | 105. D | 106. C  
created by the body Non self come from outside or foreign Autoimmune means self

117. B

118. C: Hint: given in all the books in mRNA

119. C: Hint: lipoproteins are present in basic structural framework.

120. A

121. A: Hint: present in federal book.

122. D: Hint: from Federal book.

123. B: Hint: from Federal book.

124. B

125. A

126. B: Hint: cervical

127. C: Hint: the word coccygeal is present in the federal. Concept is present in all the books.

128. B: Hint: Present in Punjab 31 pairs are present so A is wrong

All these nerves are mixed having fibers of both sensory and motor neurons (from Punjab textbook)

129. B

130. B: Hint: not present in any book.

131. C: Hint: Federal, Punjab

132. B

133. A

134. B: Hint: small pox is viral disease

141. D | 142. B | 143. C | 144. A | 145. A

156. D

157. B: Reference Present in federal book Also present in Punjab text book board

158. C: Hint Present in almost all the books of Pakistan and every province.

159. A: Hint: common question presents in almost all the book.

160. B: Hint: Diagram is given in the federal

161. C: Hint: polysaccharides.

162. B: Hint: it is type of leucoplasts

163. D: Hint: osmosis Present in federal book

164. D

## NATIONAL UNIVERSITY OF MEDICAL SCIENCES

- All of the following are chemical properties except?
  - Density
  - corrosiveness
  - Explosiveness
  - combustibility
- How many grams of carbon dioxide are contained in 1000 mL of this gas at STP?
  - 0.0280g
  - 0.560g
  - 1.96g
  - 0.560g
- Which one of the following substances has hydrogen bonding as well as Van-deer Waal's forces?
  - $F_2$
  - $Br_2$
  - $Cl_2$
  - $CH_3NH_2$
- Which of the following substance would have the greatest electrical conductivity in the solid state?
  - K
  - NaI
  - $I_2$
  - IF
- The following ground state electronic configuration corresponding to?  $[Ne]3s^23p^4$ 
  - Oxygen
  - Silicon
  - Sulfur
  - Phosphorus
- Which of the following, statements about ionic bonds is false?
  - Cations are formed from atoms with low ionization energies.
  - Ionic bonds are common in organic compounds.
  - Ionic bonds are common in inorganic compounds.
  - Ionic bonds are produced when cations and anions are held together by strong electrostatic (or columbic) forces.
- The formula for a compound of Cl that contains both ionic and covalent bonds is:
  - $NH_4Cl$
  - $CH_3Cl$
  - $NaCl$
  - $CCl_4$
- For  $CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$ , the equilibrium expression is
  - $x^2/(a-x)(b-x)$
  - $x^2/v(a-x)$
  - $4x^2/(a-x)v$
  - $4x^2v^2/(a-x)(b-x)^2$
- The enthalpy of neutralization for HCl and NaOH is
  - 393kJ/mole
  - 57.4kJ/mole
  - 110kJ/mole
  - Zero
- The oxidation number of Cr in  $Cr_2O_7^{2-}$  is?
  - +12
  - +3
- +4
  - +6
- What is the molality of a solution composed of 19.0g of cane sugar dissolved in 175g of water?
  - 0.514mol/kg
  - 0.317mol/kg
  - 0.217mol/kg
  - 2.17mol/kg
- In which one of the following compounds is oxidation state of oxygen is exceptional?
  - $Na_2O$
  - $Na_2O_2$
  - $K_2O$
  - $OF_2$
- All of the following statement about of iron is correct except?
  - Corrosion occurs more rapidly at high pH
  - Corrosion of iron slows when the iron is in contact with zinc metal
  - Oxygen acts as an oxidizing agent for iron to corrosion
  - Moisture is necessary in order for iron to corrode
- A strong acid after releasing a proton yield
  - Conjugate acid
  - Conjugate base
  - A strong acid
  - All of these
- When ratio of products to reactants is less than 1, then
  - forward reaction proceeds faster
  - backward reaction proceeds faster
  - forward reaction proceeds slower
  - forward and backward reaction proceed at equal rate
- The task of a catalyst in a chemical reaction is
  - Increasing the activation energy for the reaction.
  - Increasing the temperature of the molecules in the reaction.
  - Increasing the frequency of collisions between molecules.
  - Providing a new reaction pathway for molecules.
- Consider the reaction  $CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$ . Which of the following statements is correct?
  - The reaction is second order with respect to  $CH_3COOH$
  - The reaction is first order with respect to OH
  - The reaction is second order overall
  - All of these
- Which of the following is an insulator?
  - Fe
  - Si
  - O
  - Na



89. Which of these is a steroid hormone?  
A) ADH B) Cortisone  
C) Thyroxine D) Insulin
90. Maximum speed of impulse transmission is m/s  
A) 100 B) 110  
C) 120 D) 130
91. Which of the following is not a stimulus to release oxytocin?  
A) Distention of cervix  
B) decrease in progesterone level  
C) Neural stimulus during parturition  
D) High level of calcium ions
92. The first convoluted part of vas deferens is called:  
A) Epididymis B) Penis  
C) Scrotum D) Sperm
93. At the cephalic end of Primitive streak, closely packed cells from local thickening is known as  
A) Primitive gut B) Primitive ridges  
C) Hensen's node D) Splanchnic mesoderm
94. Morphological characters of chromosomes are collectively called  
A) Holotype B) Karyokinesis  
C) Karyotype D) Neotype
95. Which of these is a viral disease?  
A) Candidiasis B) Amoebic dysentery  
C) Mumps D) Down's syndrome
96. Which of these can cause tumors?  
A) Bacteria B) Viruses  
C) Fungi D) Protozoa
97. Which of these spreads by fecal contamination of water?  
A) Hepatitis A B) Hepatitis B  
C) Hepatitis C D) HIV
98. Dark reaction takes place in.  
A) Stroma B) Grana  
C) Inter-grana D) Thylakoids
99. Which of these carries out alcoholic fermentation?  
A) Muscles B) Mesophyll cells  
C) Yeast D) Herpes virus
100. The removal of terminal phosphate from which of the following releases maximum energy?  
A) AMP B) ADP  
C) ATP D) NAD
101. Formation of which of these causes synthesis of ATP during glycolysis?  
A) Fructose 6 phosphate  
B) Fructose 1, 6 biphosphate  
C) Dihydroxyacetone phosphate  
D) 3 phospho glycerate

HINT

102. The presence of a particular DNA fragment in a mixture of fragment of whole genome can be detected with the help of  
A) Restriction enzyme B) Probe  
C) Vector D) Ligase
103. Which technique can be reliably used to convict a crime suspect?  
A) Genome library  
B) RFLP  
C) Restriction endonuclease  
D) Blood grouping
104. Which of the following is a technique to produce products of pharmaceutical organisms?  
A) Gene cloning B) Gene Pharm  
C) Hybridization D) Transformation
105. Which of the following appears to be a suitable target for gene therapy experiments?  
A) Down's syndrome B) SCID  
C) Rabies D) Sciatia
106. Albinism is trait.  
A) Autosomal dominant  
B) Autosomal recessive  
C) X-linked dominant  
D) X-linked recessive
107. ABO blood group system is an example of  
A) Over dominance B) Co-dominance  
C) Epistasis D) Multiple alleles
108. Which of these is caused by incompatibility of blood groups of mother and child?  
A) Klinefelter's syndrome  
B) Thalassaemia  
C) Hemophilia  
D) Erythroblastosis fetalis
109. The gene frequency does not change if there is  
A) Inbreeding B) Mutation  
C) Migration D) Genetic drift
110. Which of the following species has not gone extinct in Pakistan?  
A) Houbara bustard B) Indus dolphin  
C) Common Leopard D) Indian rhino
111. Pioneers that start communities on bare rocks are mostly  
A) Mycorrhiza B) Pines  
C) Lichens D) Mosses
112. Most fungi and bacteria play the role of in ecosystem  
A) Producers B) Consumers  
C) Parasites D) Decomposers

## PHYSICS

13. Convert 48.7 kg to grams  
 A) 48,700 g  
 B)  $48.7 \times 10^4$  g  
 C)  $48.7 \times 10^3$  g  
 D)  $4.87 \times 10^4$  g
14. All physical quantities have  
 A) Precision  
 B) dimension  
 C) Inverses  
 D) exact values
115. When an object is sitting on a table at rest, the force produced by the table is perpendicular and just the amount needed to balance gravity. This force is called the force.  
 A) Weight  
 B) normal  
 C) Frictional  
 D) kinetic
116. The force required to accelerate a 1300 kg car 0 m/s to a speed of 20 m/s in a distance of 100 m will be?  
 A) 2.6 kN  
 B) 3.6 kN  
 C) 26 kN  
 D) 6.24 kN
117. All of the following statements are false except?  
 A) Weight is a measure of inert(A)  
 B) Weight can change when acceleration due to gravity changes.  
 C) Weight is the measure of the amount of matter in an object.  
 D) Mass is a force
118. The working of hydraulic press is based on  
 A) Archimedes' principle  
 B) Boyle's law  
 C) Pascal's law  
 D) Newton's laws
119. The ratio of an object's weight density to its mass density gives  
 A) Value equals to g  
 B) Absolute pressure  
 C) Value less than 1  
 D) A unit less quantity
120. The equation of continuity in fluid dynamics is a consequence of conservation of  
 A) Velocity  
 B) momentum  
 C) Energy  
 D) mass
121. In a vacuum the speed of light waves compared to the speed of radio waves is  
 A) Faster  
 B) slower  
 C) Equal  
 D) Variable
122. A polarizer and analyzer will block all light if they are  
 A)  $30^\circ$  angles  
 B) right angles  
 C)  $180^\circ$  angles  
 D) parallel angles
123. An object is positioned 20 cm from a concave spherical mirror of radius 60 cm. Describe properties of the image formed  
 A) virtual, erect, 60 cm behind mirror, magnified 3 times  
 B) virtual, erect, 12 cm behind mirror, magnified 3 times  
 C) virtual, erect, 60 cm behind mirror, magnified 3 times  
 D) virtual, erect, 60 cm in behind mirror, diminished 3 times
124. In a certain glass the speed of light is  $1.91 \times 10^8$  The refractive index of the glass?  
 A) 0.64  
 B) 1.  
 C) 4.9  
 D) 1.57
125. The part of the eye that is, responsible for night time and peripheral vision is the  
 A) Cornea  
 B) lens  
 C) Cones  
 D) rods
126. What is the magnifying power of a lens of focal length +2.0 cm when it is used as a magnifying glass for simple microscope? The lens is held close to the eyes, and the virtual image forms at the distance of distinct vision, 25 cm from the eye.  
 A) 14.0x  
 B) 12.5x  
 C) 13.5x  
 D) 1.08x
127. At  $31^\circ\text{C}$ , the speed of sound is  
 A) 0.313 km/s  
 B) 0.362 km/s  
 C) 0.35 km/s  
 D) 0.333 km/s
128. If you increase the tension of a string, the velocity of the wave in the string  
 A) increases  
 B) Decreases  
 C) Does not change  
 D) Changes non uniformly
129. The speed of an electromagnetic wave in vacuum depends on  
 A) the amplitude of magnetic and electric fields  
 B) the frequency and wavelength  
 C) The amplitude of the magnetic field but not on the amplitude of the electric field  
 D) None of the above.
130. To determine the energy in a wave is used.  
 A) Amplitude  
 B) speed  
 C) Period  
 D) frequency
131. In a longitudinal wave, the wave particles vibrate  
 A) in circles



- B) in ellipses  
C) parallel to wave propagation  
D) perpendicular to wave propagation
132. An isotope has a half-life of 7.0 h. How long does it take for 90 percent of the sample to  
A)  $8.4 \times 10^5$  s  
B)  $2.7 \times 10^5$  s  
C)  $3.8 \times 10^5$  s  
D)  $3.3 \times 10^5$  s
133. The time period of a mass of 300 g attached to a spring executing SHM is 2.4 s. Find the time period of a mass of 133 g is this mass is attached to the same spring  
A) 1.6 s  
B) 0.033 s  
C) 24.7 s  
D) 0.41 s
134. In simple harmonic motion, the velocity at any instant is not a direct function of  
A) Period  
B) amplitude  
C) Time  
D) frequency
135. The force that acts between particles of two different substances is known as  
A) Adhesion  
B) Rehesion  
C) Cohesion  
D) Elasticity
136. At  $25^\circ\text{C}$  an ideal gas has a volume of 40  $\text{cm}^3$ . Keeping the pressure constant what volume will the same gas of the same mass occupy at  $50^\circ\text{C}$ ?  
A) 80  $\text{cm}^3$   
B) 35  $\text{cm}^3$   
C) 20  $\text{cm}^3$   
D) 41  $\text{cm}^3$
137. In terms of the kinetic-molecular theory, how the expansion of substances is explained when they are heated  
A) The particles vibrate less and push other particles away  
B) The particles on the surface vibrate faster.  
C) The particles vibrate more and push other particles away.  
D) The particles vibrate more, causing air pressure to compress the substance
138. The entropy of the universe.  
A) is always decreasing  
B) is conserved  
C) is always increasing  
D) remains constant
139. A heat engine works between  $300^\circ\text{C}$  and  $15^\circ\text{C}$ . The Carnot efficiency for this heat engine is  
A) 5%  
B) 50%  
C) 72%  
D) 93%
140. In Friction the was converted to heat energy.  
A) kinetic energy  
B) nuclear energy  
C) sound energy  
D) thermal energy
141. The distance between two positively charged spheres having a charge of 1C each is 1km. Find electrostatic force between them?  
A) 9.0 kN repulsion  
B)  $9.0 \times 10^3$  repulsion  
C)  $1.0 \times 10^3$  repulsion  
D)  $9.0 \times 10^3$  repulsion
142. On rubbing a silk cloth with a Perspex rod, the rod acquires a positive charge, the cloth acquires  
A) a positive charge  
B) a negative charge  
C) no charge  
D) it is impossible to tell which sign of charge acquires
143. The rule for determining direction of force in generators is  
A) right hand rule  
B) like charges repel, unlike charges attract  
C) 'direction is determined by magnitude  
D) apply coulomb's law
144. The of a substance is the quantity which relates the electrical resistance of a given object to its physical dimensions.  
A) equivalent resistance  
B) resistivity  
C) Charge density  
D) current density
145. A circuit connected to a dry cell draws a current of 2 A. The cell has a terminal voltage of 1.4v. While the internal resistance of the cell it its open-circuit voltage is 1.58v?  
A) 0.18 ohm  
B) 0.71 ohm  
C) 0.09 ohm  
D) 1.5 ohm
146. remains same for all the resistors if they are all connected in series  
A) current  
B) potential difference  
C) Power  
D) the same charge
147. The magnetic relates the magnetis produced in material to the externally applied magnetic field  
A) Permeability  
B) susceptibility  
C) Inductivity  
D) penetrability
148. A solenoid of length 40 cm long has 5000 turns wound on it. Compute B in its interior when a current of 0.25 A exists in the winding  
A) 10.0 mT  
B) 3.9 mT  
C)  $2.5 \times 10^{-3}$  T  
D) 0.63 mT
149. Complete Faraday's law of Electromagnetic induction: The induced voltage is equal to  
A) the rate of change of the magnetic flux  
B) the rate of change of the magnetic field strength  
C) the rate of change of the magnetic force  
D) the rate of change of the loop area

150. A generator has an armature with 500 loops, which cut a flux of 8.00 mWb during each rotation. Compute the back emf it develops when run as a motor at 1500

- A) 100v  
B) 100 kv  
C) 6.0 kv  
D) 0.2v

151. A piezoelectric material

- A) Amplifies sound waves.  
B) Produces a beam of light when it enters magnetic field  
C) Deforms when a voltage is applied across it  
D) Emits infrared radiation

152. The fundamental building blocks of atoms are called particles

- A) ground-level  
B) basic  
C) element  
D) Atomic

153. The mass of electrons is

- A) equal to the mass of the proton  
B) 1835 times smaller than the mass of the proton  
C) 1835 times larger than the mass of the proton

D) None of these

154. Which uranium isotope is an important source of fuel in nuclear reactors

- A)  $^{235}\text{U}$   
B)  $^{238}\text{U}$   
C)  $^{236}\text{U}$   
D)  $^{239}\text{U}$

155. How many orbitals are possible in an f subshell?

- A) 2  
B) 5  
C) 7  
D) 10

156. Explains which of the following facts about the hydrogen atom?

- A) More than one possible Orbit exists for the electron.  
B) Only certain energies are possible for the orbiting electron  
C) More than one momentum is possible for the orbiting electron.  
D) All of these

157. A p-type semiconductor conducts electricity with

- A) Neutrons  
B) electrons  
C) Holes  
D) protons

English

158. Serendipity most closely refers to

- A) A parcel  
B) Stupidity  
C) Chance  
D) Serenity

159. Astounding most closely refers to

- A) Standing upright  
B) Impressive  
C) Beating hard  
D) Awful

160. Instigate most closely refers to

- A) Investigate  
B) Incarcerate  
C) Incinerate  
D) Incite

161. Baffled most closely refers to

- A) Battled  
B) Perplexed  
C) Engaged  
D) Betrayed

162. Deliberation most closely refers to

- A) Freedom  
B) Captivity  
C) Discussion  
D) Intentional

163. This is a very good house to live

- A) Upon  
B) On  
C) in  
D) into

164. You should abide the rules of The hostel

- A) By  
B) to  
C) for  
D) about

165. The Muslims believe one God

- A) On  
B) In  
C) At  
D) Of

166. He is ignorant his demerits

- A) In  
B) Of  
C) To  
D) On

167. He will not turn my request

- A) down  
B) in  
C) on  
D) at

168. When you are getting on with years, you get very sleepy at times

- A) Living  
B) Running  
C) Ousting  
D) Growing old

169. For the underlined words choose the most suitable alternative from the given choices A chubby little fellow made a brilliant century

- A) Strong  
B) weak  
C) Plump  
D) powerful

170. One black sheep can contaminate others.

- A) Follow  
B) Spoil  
C) Lead  
D) Activate

171. It seemed tragically sensational.

- A) Optionally  
B) Sorrowfully  
C) Strangely  
D) Half

172. Are you deliberately trying to confuse me?

- A) Delightedly  
B) Dramatically  
C) Only  
D) Intentionally

173. All is well that \_\_\_ well:

- A) Ends  
B) Ended  
C) End  
D) Will end

174. Why did they—a noise

- A) Make  
B) Makes  
C) Made  
D) Making

175. They will be \_ by the teacher

- A) Punishes  
B) Punish  
C) Punished  
D) Punishing

176. This book \_\_\_\_\_ last year.

- A) Was been published  
B) has published



- C) was published  
D) is published  
177. Good students their time.  
A) not waste

- B) are not waste  
C) does not waste  
D) do not waste

## Keys &amp; Hints

1. A	19. B	37. B	55. C	73. B	91. D	109. A	127. C	145. C	163. C
2. C	20. C	38. B	56. A	74. B	92. A	110. C	128. A	146. A	164. A
3. D	21. C	39. C	57. A	75. D	93. C	111. C	129. D	147. A	165. B
4. B	22. C	40. A	58. C	76. B	94. C	112. D	130. A	148. B	166. B
5. C	23. C	41. D	59. D	77. C	95. C	113. A	131. C	149. A	167. A
6. A	24. D	42. D	60. A	78. B	96. A	114. B	132. C	150. .	168. D
7. A	25. A	43. C	61. A	79. B	97. A	115. B	133. A	151. C	169. C
8. A	26. A	44. C	62. D	80. B	98. A	116. A	134. A	152. C	170. B
9. D	27. A	45. A	63. B	81. C	99. C	117. B	135. A	153. B	171. B
10. D	28. A	46. C	64. C	82. B	100. C	118. C	136. A	154. B	172. D
11. B	29. C	47. D	65. A	83. C	101. D	119. A	137. C	155. C	173. A
12. D	30. C	48. D	66. D	84. C	102. B	120. D	138. C	156. D	174. A
13. A	31. A	49. B	67. D	85. B	103. B	121. C	139. B	157. C	175. C
14. B	32. D	50. C	68. A	86. C	104. B	122. B	140. A	158. C	176. C
15. B	33. B	51. D	69. C	87. B	105. B	123. C	141. A	159. B	177. D
16. D	34. A	52. A	70. C	88. A	106. D	124. D	142. B	160. D	
17. C	35. D	53. C	71. A	89. B	107. B	125. D	143. A	161. B	
18. C	36. D	54. B	72. A	90. C	108. D	126. A	144. B	162. D	

- A) Sexual reproduction  
B) Asexual reproduction  
C) Both sexual and asexual  
D) None of Given
72. Carotenoids are related to  
A) Vitamin A  
C) Vitamin C  
B) Vitamin B  
D) Vitamin D
73. Bryophytes and ferns both require water for fertilization but ferns are not placed in bryophyte because they have:  
A) Ciliated spermatozoa instead of flagellated spermatozoa  
B) sporophyte as main generation instead of gametophyte generation  
C) Vascular tissue  
D) None of Given
74. Blood group of a person having and his genotypes:  
A) Have AD phenotype  
B) Only be Rh-ive  
C) Do not have antigens attached on RBCs  
D) None of given
75. Annually % of fruit is lost due to fungi.  
A) 15-20%  
C) 25-35%  
B) 35-70%  
D) 15-50%
76. Amylase is not produced by following type of salivary gland:  
A) Parotid  
C) Sublingual  
B) Submandibular  
D) None of Given
77. Among invertebrates, which possesses the greatest power of regeneration?  
A) Sponges  
C) Annelids  
B) Platyhelminthes  
D) Echinoderms
78. All of the photosynthetic bacteria use except  
A) Purple sulphur bacteria  
B) Green sulphur bacteria  
C) Purple non-sulphur bacteria  
D) None of Given
79. 75% osmotic pressure of blood is maintained by:  
A) Globulins  
C) Fibrinogen  
B) Prothrombin  
D) Albumin
80. 1 NADH in respiratory chain produces:  
A) 1 ATP  
C) 3 ATP  
B) 2 ATP  
D) 4 ATP
81. A 50g tooth paste sample has 0.2 g fluoride concentration. what is the concentration of fluoride in term of ppm level?  
A) 2509  
C) 100  
B) 200  
D) 1000
82. Acetone and chloroform are soluble into each other due to:  
A) Hydrogen bonding
- B) Dipole-dipole interaction  
C) London forces  
D) Both A & B
83. An element M forms a hydride which contains 90% of M by mass. What is the relative atomic mass of M?  
A) 27  
C) 87  
B) 30  
D) 90
84. An ionic compound is most likely to be formed when  
A) ionization energy of A is high but electron affinity of B is low  
B) The ionization energy of A is low but electron affinity of B is high  
C) Both ionization energy of A and electron affinity of B are high  
D) Both ionization energy of A and electron affinity of B are low
85. Basicity of  $H_3PO_4$  is:  
A) 1  
C) 3  
B) 2  
D) 4
86. Boiling of dilute HCl acid does not increase in concentration beyond 22 percent because HCl acid:  
A) Is very volatile  
B) Highly soluble in water  
C) Forms boiling mixture  
D) Forms saturated at this concentration
87. Both ionic and covalent bonds are present in:  
A)  $CH_4$   
C) KCl  
B)  $SO_2$   
D) NaOH
88. Half life period of the first order reaction depends upon  
A) Initial Concentration  
B) Temperature  
C) Catalyst  
D) All of above
89. Hydrocarbons which burn with smoky flame are called:  
A) Aliphatic  
C) Alkyl  
B) Aromatic  
D) None of these
90. If the compressibility factor for one mole of an ideal gas is 1 then what will be the  
A) Same  
C) Zero  
B) Different  
D) None of the above
91. In Beta elimination reaction, nucleophile attacks on:  
A) Alpha hydrogen  
C) Hydrogen  
B) Beta hydrogen  
D) Alpha carbon
92. In which of the following cases the benzene rings are isolated?

- A) Phenanthrene  
C) Naphthalene
- B) Triphenylmethane  
D) Anthracene
93. Ninhydrin reacts with amino acid to form product which has colour:  
A) Blue  
C) Bluish Violet  
B) Violet  
D) Red
94. Sod-Benzate on reacting with soda lime forms:  
A) Benzoic Acid  
C) Toluene  
B) Benzene  
D) Benzaldehyde
95. Starch is a polymer of:  
A) Fructose  
C) B-D Glucose  
B) d-D Glucose  
D) Sucrose
96. The C-H bond distance is the longest in:  
A)  $C_2H_2$   
C)  $C_2H_6$   
B)  $C_2H_4$   
D)  $C_2H_5Br$
97. The decreasing order of second ionization energy of K Ca Ba is:  
A)  $K > Ca > Ba$   
C)  $Ba > K > Ca$   
B)  $Ca > Ba > K$   
D)  $K > Ba > Ca$
98. The essential condition for Optically Activity of an organic-compound is:  
A) Dextrorotatory  
B) Levorotatory  
C) Presence a-symmetric carbon  
D) Molecular dy-symmetry
99. The formula of washing soda is:  
A)  $Na_2CO_3$   
B)  $Na_2CO_3 \cdot H_2O$   
C)  $Na_2CO_3 \cdot 7H_2O$   
D)  $Na_2CO_3 \cdot 10H_2O$
100. The maximum number of electrons with  $n:3$  and  $l:2$  is  
A) 10  
C) 18  
B) 6  
D) 0
101. The molecule with zero dipole moment is:  
A)  $NH_3$   
C)  $BF_3$   
B)  $H_2O$   
D)  $SO_2$
102. The number of sigma and pi bonds in 1-butene-3-yne?  
A) 5 sigma and 5 pi  
B) 7 sigma and 3 pi  
C) 8 sigma and 2 pi  
D) 6 sigma and 4 pi
103. The overall positive reaction potential value predicts that process is:  
A) Not feasible  
C) Impossible  
B) Feasible  
D) No indication
104. The radiation from a naturally occurring radioactive substance, as seen after deflection by a magnetic field in one direction, are:  
A) Definitely a-rays
- B) Definitely B rays  
C) Both Alpha and beta rays  
D) Either Alpha or Beta rays
105. The rate of a reaction in general can be increased by all the following factors except:  
A) By increasing temperature  
B) Using a suitable catalyst  
C) By an increase in activation energy  
D) By increasing conc. of reactants
106. The Sweetest of All Sugars is:  
A) Glucose  
C) Sucrose  
B) Maltose  
D) Fructose
107. The vapour pressure of water at room temperature is 23.8mm Hg. the vapour pressure of an aqueous solution of sucrose with mole fraction 0.2 is equal to:  
A) 19.04 mm Hg  
B) 24.2 mm of Hg  
C) 21.42 mm of Hg  
D) 21.4 mm of Hg
108. The number of moles of  $NO_2$  which contains 16 g of Oxygen:  
A) 0.25  
C) 1.0  
B) 0.50  
D) 1.50
109. Tincture of Iodine is:  
A) in alcohol  $CHI_3$   
C) in  $KI$   $I_2$   
B) in alcohol  
D) in  $KI$   $CHI_3$
110. Transition Elements Usually show:  
A) Para magnetism  
B) Diamagnetism  
C) Ferromagnetism  
D) Both Ferromagnetism and Para magnetism
111. What is the mass of same no of atoms of potassium as are present in 11.5 grams of sodium?  
A) 19g  
C) 39g  
B) 19.5 g  
D) 78g
112. What is the molarity of 25 % NaOH solution?  
A) 5.0  
C) 3.125  
B) 6.25  
D) 2.5
113. When ethylene ozonide is treated with Zn-dust we get:  
A) Ethanal  
C) Methanol  
B) Methanal  
D) Ethanol
114. When fused  $PbBr_2$  is electrolyzed:  
A) Bromine appears at the cathode  
B) Lead is deposited at the cathode  
C) Lead appears at the anode  
D) None of given
115. Which compound shuns minimum hydrogen bonding high stater?



## NATIONAL UNIVERSITY OF MEDICAL SCIENCES

1. Y chromosome in humans
  - A) Is completely inert
  - B) Carries few genes
  - C) Carries many genes
  - D) Contains genes for hemophilia and colour blindness
2. Wood is not formed in:
  - A) Monocots
  - B) Dicots
  - C) Gymnosperms
  - D) All of given
3. Which type of chlorophyll is found in in types of algae?
  - A) Chlorophyll a
  - B) Chlorophyll b
  - C) Chlorophyll c
  - D) Chlorophyll d
4. Which of the following is not related with apoptosis?
  - A) loss of tail of developing human embryos
  - B) loss of tissue between developing digits
  - C) Controlling the number of neurons
  - D) None of Given
5. Which of the following is not parasitic fungus of plants?
  - A) Rust
  - B) Mildews
  - C) Annillaria
  - D) None of Given
6. Which of the followings is not component of extra-cellular matrix in bacteria?
  - A) Cell wall
  - B) Slime
  - C) Capsule
  - D) Cell membrane
7. Which of the following is not an infection of the lungs/ respiratory tract?
  - A) Histoplasmosis
  - B) Tuberculosis
  - C) Cystic fibrosis
  - D) None of Given
8. Which of the following is correct in humans?
  - A) Both sperm and egg contain Yolk
  - B) All genetic information comes from sperm
  - C) Sperm contains little cytoplasm
  - D) Fertilization commonly occurs in uterus
9. The organism having wings with claws.
  - A) Eagle
  - B) Kestrel
  - C) Archaeopteryx
  - D) Mallard
10. The fungus provides chemotherapeutic agent that is used to inhibit fungal growth?
  - A) Penicillium notatum
  - B) Aspergillus
  - C) Penicillium griseofulvum
  - D) Claviceps purpurea
11. Which of the following feature is not related to vexillum in pea family?
  - A) Large
  - B) Single
12. Which of the following does not belong to same linkage group?
  - A) Sickle cell anemia
  - B) Albinism
  - C) Leukemia
  - D) Goat
13. Which of the following correctly explains the structure of myoglobin?
  - A) 4 polypeptide chains + 4 haeme portions
  - B) 4 polypeptide chains + 1 haeme portions
  - C) 1 polypeptide chains + 4 haeme portions
  - D) 1 polypeptide chains + 1 haeme portions
14. The leg of cockroach which acts as 'prop' during walking?
  - A) Anterior leg
  - B) Posterior leg
  - C) Middle leg
  - D) All Given
15. Which component enters into mitochondria after glycol sis?
  - A) Pyruvate
  - B) Acetate
  - C) Oxaloacetate
  - D) Acetyl-CoA
16. What will be the approximate length of a DNA strand having 500 nucleotides?
  - A) 100 nm
  - B) 130 nm
  - C) 170 nm
  - D) 150 nm
17. Viral disease that is widely spread and caused by enveloped RNA virus is:
  - A) AIDS
  - B) Hepatitis
  - C) Measles
  - D) Influenza
18. Vaccination can be done against:
  - A) Bacterial diseases only
  - B) Viral diseases only
  - C) Both Viral and Bacterial
  - D) All type of disease causing organisms
19. Useful bacteria at large intestine of humans produce:
  - A) Vitamin K
  - B) Vitamin E
  - C) Vitamin D
  - D) Vitamins C
20. Undigested food in cockroach is stored in:
  - A) Crop
  - B) Rectum
  - C) Gizzard
  - D) Crop & Rectum
21. Type of sclerenchyma cells found in seed coats are:
  - A) Fibers
  - B) Tracheids
  - C) Sclerids
  - D) Vessels
22. Type of lichen which is leaf like in appearance is:
  - A) Lecanor
  - B) Ramalina
  - C) Parmelia
  - D) Bacida
23. Trichome of Nostoc is surrounded by:

- A) Pellicle  
C) Mucilaginous sheath  
B) Capsule  
D) None of given
24. The ultimate source of all changes is:  
A) Mutation  
C) Genetic drift  
B) Migration  
D) Change in allelic frequency
25. The lymph vessels empty in:  
A) Arteries  
C) Capillaries  
B) Veins  
D) None of given
26. The helical structure of a protein is kept by formation of hydrogen bond between amino acid molecules which are:  
A) Adjacent to each other  
B) In successive turns of spiral  
C) Between two different polypeptide chains  
D) None of Given
27. Tail can be regenerated in:  
A) Larvae of amphibian  
B) Lizard  
C) Both lizard and larvae of amphibian  
D) None of Given
28. Symptoms of malaria occur specifically due to formation of:  
A) Sporozoite  
C) Gametocyte  
B) Merozoite  
D) Oocyte
29. Such Inflorescence in which main axis is elongated and bears sessile flowers is called  
A) Raceme  
C) Cyme  
B) Spike  
D) Panicle
30. Semilunar valves are not present:  
A) At base of pulmonary trunk  
B) At base of aorta  
C) In veins  
D) Coronary artery
31. Second major form of hepatitis is:  
A) Hepatitis A  
C) Hepatitis C  
B) Hepatitis B  
D) Hepatitis D
32. Scales are present in:  
A) Fishes  
C) Birds  
B) Amphibians  
D) Reptiles
33. Reduction division is:  
A) Amitosis  
C) Meiosis I  
B) Mitosis  
D) Meiosis II
34. Reactive parts of an amino acid are:  
A) Alpha carbon & amino group  
B) Amino group & carboxyl group  
C) Carboxyl group & R group  
D) R group & alpha carbon
35. Ptyalin can convert starch into  
A) Monosaccharide form  
B) Oligosaccharide form

- C) Polysaccharide form  
D) All given option
36. Process of aging:  
A) Can be slowed down by adequate sleep  
B) Can be slowed down by regular meal  
C) Cannot be slowed down in any way  
D) Both by Adequate Sleep and Regular meal
37. Plant protects itself from rapid chilling through  
A) Increasing unsaturated fatty acids  
B) Increasing protein contents  
C) Both Increasing protein contents and unsaturated fatty acids  
D) None of Given
38. Plant on which teliospores attack produce in its seeds.  
A) Tetiospores  
B) Dikaryotic hyphae  
C) Monokaryotic hyphae  
D) None of given
39. Pick the mismatched pair for birds:  
A) Air spaces - lighter body  
B) Pectoral muscles - strong pull of wings  
C) Urinary bladder, producing semisolid urine  
D) Keel - attachment of muscles
40. Pick the correct option about Drosophila?  
A) Male is larger with pointed abdomen  
B) Female has sex combs on front legs  
C) It has generation time of just eight weeks  
D) 1 Salivary gland cells have giant chromosomes in their nuclei
41. Percentage of magnesium by mass of a human being is:  
A) 0.005%  
C) 0.51%  
B) 0.25%  
D) 0.35%
42. Pectoral fins are enlarged in:  
A) Whale  
C) Skates  
B) Shark  
D) Plaice
43. Oxygen is transported by combining with in Hb.  
A) Nitrogen  
C) Carbon  
B) Iron  
D) Hydrogen
44. Only one ovary is functional at a time in  
A) Human  
C) Pigeon  
B) Eagle  
D) Pigeon and human
45. Nitrogen fixing bacteria in root nodules fix nitrogen in soil air into:  
A) Ammonia  
C) Nitrate  
B) Nitrite  
D) Amino acid
46. Metabolically dormant body produced within the bacterial cell membrane is:  
A) Capsule  
C) Cyst  
B) Spore  
D) Cyst and spore

47. Menstrual cycle can be divided into  
 A) Single phase  
 B) Two phases  
 C) Three phases  
 D) Four phases
48. Maximum mammalian characters are present in these:  
 A) metatheria  
 B) Prototheria  
 C) Eutheria  
 D) None of Given
49. Leptocardii is group of:  
 A) Urochordata  
 B) Cephalochordata  
 C) Vertebrata  
 D) Mollusca
50. Leaves of \_\_\_\_\_ are used to cure cough and cold in horses:  
 A) Glycyrrhiza glabra  
 B) Cephalochordate  
 C) Bamboo  
 D) Mollusc
51. J-Seiler in 1914 discovered which type of sex determination in moths?  
 A) XO-XX  
 B) XY-XX  
 C) ZZ-ZW  
 D) None of given
52. It is the most critical phase of mitosis  
 A) Prophase  
 B) Tellophase  
 C) Anaphase  
 D) Metaphase
53. If which of the following, mitotic division is involved:  
 A) Oogonium to primary oocyte  
 B) Primary oocyte to secondary oocyte  
 C) Secondary oocyte to egg  
 D) None of Given
54. In Maxam-Gilbert method, DNA threads are:  
 A) Chemically synthesized  
 B) Synthesized from mRNA  
 C) Synthesized by using terminating nucleotides  
 D) Chemically cut into pieces
55. If allele frequency for a dominant allele is 0.4, % what will be number of Heterogeneous individuals if population is of 100 individuals with diploid traits.  
 A) 36  
 B) 48  
 C) 52  
 D) 74
56. How much carbon dioxide is transported through blood proteins?  
 A) 5%  
 B) 20%  
 C) 25%  
 D) 70%
57. Highest blood pressure is found in:  
 A) Arteries.  
 B) Veins  
 C) Capillaries  
 D) None of Given
58. Green house gases are those that:  
 A) Prevent entry of ultraviolet rays  
 B) Prevent rain fall  
 C) Prevent heat to escape  
 D) All Given Options are Correct
59. Grassland of Argentina is:

## NUMS and National MDCAT by Ali Sudain

- A) Praires  
 B) Savana  
 C) Boreal  
 D) Pampas
60. Genetic recombination in bacteria can occur through  
 A) Conjugation  
 B) Transformation  
 C) Transduction  
 D) All Given
61. Founder of cell biology is:  
 A) Schleiden & Schwann  
 B) Galileo  
 C) Robert Hooke  
 D) Robert Brown
62. Etioplasts found in plants are actually one of the type of:  
 A) Chloroplasts  
 B) Chromoplast  
 C) Leucoplasts  
 D) None of Given
63. Drosophila sperm cell contains:  
 A) 4 chromosomes  
 B) 8 chromosomes  
 C) 8 pair of chromosomes  
 D) 3 chromosomes
64. DNA fingerprinting is basically done for:  
 A) DNA cloning  
 B) DNA analysis  
 C) DNA sequencing  
 D) DNA slicing
65. Diameter of DNA double helix is:  
 A) 3.4 nm  
 B) 0.3 nm  
 C) 2 nm  
 D) 0.2 nm
66. Diameter of an artery can be changed by:  
 A) nervous stimulation  
 B) Chemical stimulation  
 C) Both Chemical and Nervous Stimulation  
 D) None of Given
67. Dermal, Denticle scales of fishes are called:  
 A) Placoid scales  
 B) Ganoid scales  
 C) Ctenoid scales  
 D) Cycloid scales
68. Dark purple or black spore case of Claviceps purpurea is:  
 A) Smut  
 B) Rust  
 C) Ergot  
 D) Aspergin
69. Continuous variations in a population were first observed by:  
 A) Mendel  
 B) Correns  
 C) Nilsson  
 D) Darwin
70. Condensation of chromosomes reaches to maximum during:  
 A) Zygotene  
 B) Pachytene  
 C) Diplotene  
 D) Diakinesis
71. Cloning is production of genetically identical copies of organisms/ cells by:



116. Which is the configuration of  $\text{Cr}^{3+}$ ?  
 A)  $3d^4 4s^1$  B)  $3d^3 4s^1$   
 C)  $3d^4 4s^2$  D)  $3d^3 4s^2$
117. Which of the following contains the co-ordinate covalent bond?  
 A)  $\text{BaCl}_2$  B)  $\text{NH}_3$   
 C)  $\text{BF}_3$  D) Both B and C
118. Which of the following do not have variable valency?  
 A) Cobalt B) Iron  
 C) Manganese D) Zinc
119. Which of the following gas is more ideal at STP?  
 A)  $\text{SO}_2$  B)  $\text{NH}_3$   
 C)  $\text{H}_2$  D)  $\text{H}_2\text{S}$
120. Which of the following gas is not present in coke  
 A) Carbon dioxide  
 B) Carbon monoxide  
 C) Oxygen  
 D) Hydrogen
121. Which of the following has maximum hydration power?  
 A)  $\text{Na}^+$  B)  $\text{K}^+$   
 C)  $\text{Mg}^{2+}$  D)  $\text{Cu}^{2+}$
122. Which of the following has the maximum no of unpaired electrons?  
 A)  $\text{Mg}^{2+}$  B)  $\text{V}^{3+}$   
 C)  $\text{Ti}^{3+}$  D)  $\text{Fe}^{2+}$
123. Which of the following is having inert gas configuration?  
 A)  $\text{Pb}^{+4}$  B)  $\text{As}^{+3}$   
 C)  $\text{Zn}^{+2}$  D)  $\text{Ti}^{+4}$
124. Which of the following is not locating agent?  
 A)  $\text{H}_2\text{S}$  B)  $\text{CS}_2$   
 C) Rubenic acid D) Ninhydrin
125. Which of the following is the reducing agent:  
 A)  $\text{C}_2\text{H}_2$  B)  $\text{C}_2\text{H}_5\text{CHO}$   
 C)  $\text{C}_2\text{H}_5\text{OH}$  D)  $(\text{CH}_3)_2\text{CO}$
126. Which of the following transition metals in its ground state have unpaired electron in an s-orbital?  
 A) Cr B) Co  
 C) Fe D) Cu
127. Which one is not related with evaporation?  
 A) Continuous B) Endothermic  
 C) Exothermic D) Spontaneous
128. The property of liquid that is measured by polarimeter  
 A) Conductance B) Refractive Index  
 C) Optical activity D) Change in Volume
129.  $\text{NaNO}_3$  on heating gives:  
 A)  $\text{O}_2$  B)  $\text{NO}_2$

130. How many balloons of capacity  $0.25\text{dm}^3$  at atm. can be filled from hydrogen.  
 A) 50 B) 90  
 C) 180 D) 200
131. The bonds present in  $\text{N}_2\text{O}_5$  are:  
 A) Only Ionic  
 B) Covalent and Coordinate  
 C) Only Covalent  
 D) Covalent and Ionic
132. A crystal system having all sides A) b not equal and angles  $\alpha = \beta = \gamma = 90^\circ$   
 A) Cubic B) Rhombohedral  
 C) Orthorhombic D) Hexagonal
133.  $\text{SN}_2$  can be best carried out with:  
 A) Primary alkyl halide  
 B) Secondary alkyl halide  
 C) Tertiary alkyl halide  
 D) All of the above
134. 15g of urea is dissolved in  $180\text{cm}^3$  of water. The relative lowering of vapour pressure:  
 A) 0.024 B) 25.024  
 C) 2.5 D) 10.25
135. The KSP of  $\text{AgCl}$  is  $2.0 \times 10^{-10} \text{mol}^2 \cdot \text{dm}^{-4}$ . The maximum concentration of  $\text{Ag}^+$  ions  
 A)  $2.0 \times 10^{-10} \text{mol} \cdot \text{dm}^{-3}$   
 B)  $1.41 \times 10^{-5} \text{mol} \cdot \text{dm}^{-3}$   
 C)  $1.0 \times 10^{-5} \text{mol} \cdot \text{dm}^{-3}$   
 D)  $4.0 \times 10^{-20} \text{mol} \cdot \text{dm}^{-3}$
136. Which of the following has least electron affinity value?  
 The shape of  $\text{SnCl}_2$  is:  
 A) Linear B) Tetrahedral  
 C) Angular D) Trigonal Planar
137. IUPAC name for  $[\text{Pt}(\text{Cl})(\text{Br})(\text{NO}_2)(\text{NH}_3)_3]\text{Cl}$   
 A) Triammine chlorobromonitro platinum Chloride  
 B) Triammine chlorobromonitro platinate Chloride  
 C) Triammine chlorobromonitro platinum Chloride  
 D) Triammine chlorobromonitro platinum Chloride
138. Rate =  $k[\text{A}]^2[\text{B}]$  for the reaction  $2\text{A} + 3\text{B} \rightarrow \text{C}$  product where A and B are present in:  
 A) 1<sup>st</sup> B) 2<sup>nd</sup>  
 C) 3<sup>rd</sup> D) 4<sup>th</sup>
139.  $\text{P}_2\text{O}_5$  is Hygroscopic powder which sublimes at:  
 A) 260 Degree Celsius  
 B) 360 Degree Celsius  
 C) 630 Degree Celsius

139. A body of mass 2 kg absorbed 10J of radioactive radiations then absorbed dose of radiation in rad is  
 A) 5 B)  $5 \times 10$   
 C) 20 D) 20
140. A disc, a hoop and a sphere of same mass and radius are rolled down from a frictionless inclined plane. Which has greater speed on reaching the ground?  
 A) Disc B) Loop  
 C) Sphere D) All have same speed
141. A logic gate has four inputs, its possible input combination will be:  
 A) 4 B) 16  
 C) 12 D) 64
142. A maintenance crew is working on a section of a three-lane highway only lane open to traffic. The result is much slower of traffic flow. Do cars on a highway behave like:  
 A) The molecules of an incompressible fluid  
 B) The molecules of a compressed fluid  
 C) Both A) and B)  
 D) None of the above
143. A square coil of side 16 cm has 200 turns and rotates in a uniform magnetic field of magnitude 0.05 T, if the peak emf is 12 V, what is the angular velocity of the coil?  
 A)  $43 \text{ rad s}^{-1}$  B)  $49 \text{ rad s}^{-1}$   
 C)  $47 \text{ rad s}^{-1}$  D) 45 and  $\text{s}^{-1}$
144. According to Einstein bodies and Light rays follow:  
 A) Rectilinear Path B) Circular Path  
 C) Geodesics D) Parabolic
145. An AC emf of  $V = 200 \sin(100\pi t)$  volt is concerned to a choke of negligible resistance. In order to produce current of amplitude 1 A, the inductance of choke should be:  
 A) 200 B)  $2\pi$   
 C)  $\frac{1}{\pi} \text{ H}$  D)  $\frac{2}{\pi} \text{ H}$
146. An aeroplane is flying in a straight line at a constant altitude. If a wind gust strikes and raises the nose of the airplane, the nose will bob up and down until the plane eventually return's to it's original position altitude. Are these oscillation's are:  
 A) Over damped B) Under damped  
 C) Critically damped D) Over damped
147. An electron describes a circular orbits of radius 2 cm in a uniform magnetic field. If speed of electron is doubled then radius of the orbit will:

- A) 1 cm B) 4 cm  
 C) 2 cm D) 4 cm
148. An electron is moving along the axis of a solenoid carrying a current which of the following is a correct statement about the electromagnetic force acting on the electron?  
 A) The force act perpendicular to its motion  
 B) The force act anti parallel to its motion  
 C) The force act in the direction of motion  
 D) No force acts
149. As temperature of the black body is raised the black body radiations become richer in:  
 A) Intermediate Wavelength  
 B) Longer Wave lengths  
 C) Shorter Wave length  
 D) Low Frequencies
150. At which of the following places, motion of simple pendulum becomes slowest  
 A) Murree B) Karachi  
 C) K-2 D) Peshawar
151. Equation of SHM, with amplitude 'a' is given by:  
 A)  $X = a(\sin^2 \omega t + \cos^2 \omega t)$   
 B)  $X = a(\sin \omega t \cos^2 \omega t)$   
 C)  $X = a \sin \omega t$   
 D)  $X = a^2 \sin(\sin \omega t)$
152. How much more thumb pressure must a nurse use to administer an injection with a hypodermic needle of inside diameter 0.30 mm compared to one with inside diameter 0.60 mm? Assume that the two needles have the same length and that the volume flow rate is the same in both cases.  
 A) Twice as much  
 B) 4 times as much  
 C) 8 times as much  
 D) 16 times as much
153. If the length of a second's pendulum is L, then the length of pendulum having a period 1 sec will be  
 A)  $L/2$  B)  $2L$   
 C)  $4L$  D)  $L/4$
154. In RLC series circuit at resonance the voltage across R, L and C are 10 V, 30 V and 30 V respectively then applied voltage will be:  
 A) 30 V B) 10 V  
 C) 40 V D) 20 V
155. Let an emf of 120 volt of negligible internal resistance connected across a resistance of 1000 ohm. Then the current flowing through the circuit will be:  
 A) 120 A B)  $120 \times 10^3 \text{ A}$   
 C)  $120 \times 10^4 \text{ A}$  D) None

157. A glider moves on a horizontally surface back and forth.

- A)  $v_x > u$  and  $a > 0$   
 B)  $v_x = 0$  and  $a < 0$   
 C)  $v_x < u$  and  $a < 0$   
 D)  $v = u$  and  $a < 0$

158. The first excitation energy of H atom will be:

- A) 10.2 eV  
 B) 3.4 eV  
 C) -13.6 eV  
 D) 13.6 eV

159. The number of LED segments used in a Calculator Display:

- A) 8  
 B) 10  
 C) 7  
 D) None

160. The ratio of angular speed of moon around the Earth to its angular speed about its own axis is:

- A) 2:1  
 B) 1:6  
 C) 1:30  
 D) 1:1

161. The six strings of a guitar are the same length under nearly the same tension, but they have different thickness. On which string do waves travel the fastest?

- A) The thickest string  
 B) The thinnest string  
 C) The wave speed is the same on all the strings  
 D) None of the above

162. To double the total energy for a mass spring system oscillating in SHM, by what factor must the amplitude increase?

- A) 4  
 B) 2  
 C)  $\sqrt{2} = 1.414$   
 D)  $\sqrt{2} = 1.189$

163. Two points charges of +5 C and -12 C attract each other with a force of 1.48 N. charge of -5C is added to each of these charges. Now the force will be:

- A) 1.48 N (attractive)  
 B) 1.48 N (repulsive)  
 C) 2.96 (repulsive)  
 D) Zero

164. Two spheres of the same size, one of mass 5 kg and other of mass 50 g are dropped simultaneously from a tower. When they are about to touch the ground they have the same:

- A) Kinetic Energy  
 B) Potential Energy  
 C) Momentum  
 D) Acceleration  
 E) All Given Options

165. When an observer moves with velocity of light relative to a timing device at rest, he would notice:

- A) Absolute time  
 B) Improper time  
 C) Infinite time  
 D) Proper time

166. When brakes of a car are applied, angular velocity of a flywheel reduces from 900 cycle/min to 720 cycle/min. In 6 sec. Angular retardation is:

- A)  $\pi \text{ rad/s}^2$   
 B)  $9\pi \text{ rad/s}^2$

C)  $8\pi \text{ rad/s}^2$

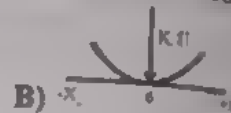
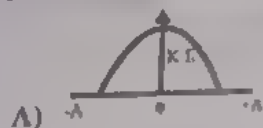
D)  $\frac{2}{3}\pi \text{ rad/s}^2$

E) Insufficient Data

167. When the output power equals to one-half of input power, efficiency of the transformer becomes:

- A) 0%  
 B) 100%  
 C) 50%  
 D) 200%

168. Which Graph in SHM show K.E. of body:



D) NONE

169. Which of the following represent  $\tan \theta$ ?

- A)  $\frac{\vec{AB}}{\vec{AXB}}$   
 B)  $\frac{\vec{AXB}}{\vec{AXB}}$   
 C)  $\frac{\vec{AXB}}{\vec{AB}}$   
 D)  $\frac{|\vec{AB}|}{\vec{AB}}$

170. Which one has proper use of preposition?

- A) "If I am lying, the curse of Allah be on me and way I be drowned in some period. May I even be deprived from a decent burial!"  
 B) If I am lying, the curse of Allah be on me and may I be drowned in some period May I even be deprived at a decent burial!"  
 C) If I am lying, the curse of Allah be on me and may I be drowned in some period. May I even be deprived off a decent burial!"  
 D) If I am lying, the curse of Allah be on me and may I be drowned in some period. May I even be deprived of a decent burial!"

171. Voracious means

- A) Excitable  
 B) Greedy  
 C) Honest  
 D) Circular

172. The secretary.....agreed to.....the president's decision. Knowing that the Information was less than factual and against her basic beliefs regarding deceptive sales practices.

- A) Willingly... support  
 B) Maliciously... sway  
 C) Selectively... acknowledge  
 D) Furtively... foster  
 E) Grudgingly... abide by

173. The parade route was down the main boulevard.

- A) Alley  
 B) Highway  
 C) Avenue  
 D) Driveway

174. The chess master promised to \_\_\_\_\_havo upon his opponent's pawn for taking his bishop.

- A) Endow  
 B) Placate





194. Let UDOMETER is coded as DUMOTER, how will SUBLEASE be coded?

- A) USBAELES B) USLBFAE  
C) USLBAELS D) USLBEALS

195. If EXPLAINING is written as PXEALNMG, Then PRODUCED is written as that code as

- A) ORPBUDIC B) ROPUDLCL  
C) ORPUDECD D) None of Given

196. Identify Which do not possess the same kind meaning as the others:

- A) Honesty and Integrity  
B) Bondage and Freedom  
C) Risk and Danger  
D) Pain and Agony

197. Find the missing number in the BOX given Below:

7	10	16
1	22	40
3	58	?

- A) 122 B) 112  
C) 69 D) 98

198. A man walks 3 km northwards and then turns left and goes 2 km. He again turns left and goes on 1 km. He turns right and walk. Straight. In which direction he is walking?

- A) EAST B) WEST  
C) NORTH D) SOUTH

199.  $100 - 11 = 32111 + 1000 = 43100 + 100 -$

- A) 224 B) 245  
C) 22 D) 25

190. A child was delighting the children with its imaginative characters and unpredictable sets.

- A) Archane B) Archane  
C) Archane D) Archane

191. Which word does not belong to the group in each the following question?

- A) Ear B) Ear  
C) Ear D) Nose

192. What is the missing number in the triangle on the right?

A	A	A
C	B	C
C	B	C

- A) 34 B) 39  
C) 34 D) 34

193. None of these

192. Suppose in a certain language MADRAS is coded as NBFBSBT. Then BOMBAY is coded in that language as:

- A) CPNCPZ B) CPNCBX  
C) CPOCBZ D) COOCBZ

193. Odd one Out:

- A) Eagle B) Cloud  
C) Sparrow D) Plane

KEY & HINTS

52. C	103. B	154. D
53. A	104. A	155. B
54. D	105. A	156. A
55. A	106. D	157. B
56. A	107. A	158. A
57. D	108. B	159. C
58. A	109. B	160. C
59. D	110. D	161. A
60. A	111. B	162. C
61. C	112. B	163. D
62. A	113. C	164. D
63. B	114. B	165. C
64. B	115. B	166. A
65. C	116. A	167. C
66. D	117. D	168. ..
67. A	118. D	169. D
68. A	119. C	170. A
69. D	120. C	171. C
70. D	121. C	172. E
71. B	122. D	173. C
72. A	123. A	174. E
73. C	124. B	175. B
74. C	125. B	176. D
75. D	126. A	177. D
76. C	127. C	178. A
77. A	128. C	179. C
78. D	129. D	180. B
79. D	130. D	181. D
80. C	131. C	182. D
81. B	132. C	183. A
82. A	133. A	184. A
83. A	134. A	185. A
84. D	135. B	186. A
85. C	136. C	187. B
86. C	137. D	188. B
87. D	138. A	189. A
88. B	139. B	190. A
89. B	140. C	191. A
90. A	141. C	192. A
91. B	142. B	193. C
92. D	143. A	194. A
93. C	144. C	195. A
94. B	145. C	196. B
95. A	146. D	197. B
96. C	147. B	198. A
97. A	148. A	199. C
98. C	149. A	
99. D	150. C	
100. A	151. C	
101. C	152. C	
102. A	153. D	



32. The information received at the other end of the fiber can be inaccurate due to \_\_\_\_\_ of light signal  
 A) Longer wavelengths  
 B) Frequency  
 C) Intensity  
 D) Dispersion spreading
33. The pressure on the other sides and energy where inside the vessel will be same and according to the: \_\_\_\_\_  
 A) Pascal's law  
 B) Boyle's law  
 C) Charles's law  
 D) Hook's law
34. The value of universal constant "R" is \_\_\_\_\_  
 A)  $8.314 \text{ Jmol}^{-1}\text{K}^{-1}$   
 B)  $1.38 \text{ Jmol}^{-1}\text{K}^{-1}$   
 C)  $1.38 \text{ Jmol}^{-1}\text{K}^{-1}$   
 D)  $8.314 \text{ Jmol}^{-1}\text{K}^{-1}$
35. For adiabatic process, the first law of thermodynamics is:  
 A)  $W = \Delta U + Q$   
 B)  $Q = W$   
 C)  $Q = -W$   
 D)  $W = -\Delta U$
36. The entropy of universe always \_\_\_\_\_  
 A) Decreases  
 B) Increases  
 C) Remains the same  
 D) Both A and B
37. If the body is rotating with uniform angular velocity, then its torque is \_\_\_\_\_  
 A) Zero  
 B) 90 degree  
 C) 1  
 D) -1
38. The direction of the magnetic lines of force depends \_\_\_\_\_  
 A) Nature of material of conducting wire  
 B) Area of conducting wire  
 C) Amount of current  
 D) Direction of current
39. A uniform magnetic field is represented by a set of lines of force which are:  
 A) Parallel  
 B) Divergent  
 C) Convergent  
 D) None of these
40. Weber ampere per meter is equal to \_\_\_\_\_  
 A) Joule  
 B) Watt  
 C) Newton  
 D) Henry
41. The difference between soft and hard X-rays is of:  
 A) Velocity  
 B) Intensity  
 C) Frequency  
 D) Polarization
42. Which of the following is an instrument for monitoring radiations?  
 A) GM tube  
 B) Geiger counter  
 C) Wilson cloud chamber  
 D) All of these

31. The value of universal constant "R" is \_\_\_\_\_

32. The information received at the other end of the fiber can be inaccurate due to \_\_\_\_\_ of light signal

33. The pressure on the other sides and energy where inside the vessel will be same and according to the: \_\_\_\_\_

34. The value of universal constant "R" is \_\_\_\_\_

35. For adiabatic process, the first law of thermodynamics is:

36. The entropy of universe always \_\_\_\_\_

37. If the body is rotating with uniform angular velocity, then its torque is \_\_\_\_\_

38. The direction of the magnetic lines of force depends \_\_\_\_\_

39. A uniform magnetic field is represented by a set of lines of force which are:

40. Weber ampere per meter is equal to \_\_\_\_\_

41. The difference between soft and hard X-rays is of:

42. Which of the following is an instrument for monitoring radiations?

43. The value of universal constant "R" is \_\_\_\_\_

44. The information received at the other end of the fiber can be inaccurate due to \_\_\_\_\_ of light signal

45. The pressure on the other sides and energy where inside the vessel will be same and according to the: \_\_\_\_\_

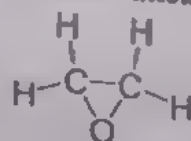
46. The value of universal constant "R" is \_\_\_\_\_

47. For adiabatic process, the first law of thermodynamics is:

48. The entropy of universe always \_\_\_\_\_

49. If the body is rotating with uniform angular velocity, then its torque is \_\_\_\_\_

40. Bakelite is a polymer of formaldehyde and:  
 A) Phenol B) Ethanol  
 C) Butanol D) Methanol
41. To avoid the formation of toxic compounds with chlorine which substance is use for disinfection of water  
 A)  $\text{KMnO}_4$  B) Chloramines  
 C)  $\text{O}_3$  D) Alums
42. To avoid the formation of toxic compounds with chlorine substance is used for disinfecting water?  
 A)  $\text{KMnO}_4$   
 B) Chloramines  
 C)  $\text{O}_3$
43. Identify the correct order?  
 A) Organ>function>cell>tissue  
 B) Cell>organ>tissue>function  
 C) Cell>tissue>organ>system  
 D) Tissue>organ>cell>function
44. Blood containing  $\text{CO}_2$  is:  
 A) Red color B) Blue color  
 C) Reddish purple color D) Reddish blue color
45. The mechanism by which substances are removed from the blood and are directly added to the tubular fluid is called:  
 A) Glomerular filtration B) Excretion  
 C) Tubular secretion  
 D) Tubular re-absorption
46. In acidic medium, oxidation action of potassium permanganate depends upon:  
 A)  $\text{Mn}^{2+}$  B)  $\text{Mn}^{3+}$   
 C)  $\text{MnO}_2$  D)  $\text{Mn}^{4+}$   
 E)  $\text{Mn}^{4+}$
47. The energy required to remove the outer electron from gaseous atom is called:  
 A) Electro negativity B) Electro positivity  
 C) Ionization potential D) Electron affinity
48. Which sequence of reaction conditions should be used to produce the compound below from benzene?  
 A)  $\text{AlCl}_3/\text{Cl}_2$ ,  $\text{H}_2/\text{Rh}/\text{C}$   
 B)  $\text{Cl}_2/\text{UV light}$ ,  $\text{H}_2/\text{Rh}/\text{C}$   
 C)  $\text{H}_2/\text{Rh}/\text{C}$ ,  $\text{AlCl}_3/\text{Cl}_2$   
 D)  $\text{HCl}$ ,  $\text{H}_2/\text{Rh}/\text{C}$
49. If the absolute temperature of a gas is reduced to one half and the pressure is doubled, the volume of gas will be:  
 A) Increased four times  
 B) Decreased four time  
 C) Remain unchanged  
 D) reduced to one half  
 E) increased two times
50. Change in extensive property is proportional to the change in \_\_\_\_\_ of material  
 A) Temperature B) Volume  
 C) Quantity D) Pressure
51. Which of the following has the highest electrical conductivity?  
 A) Aqueous sugar solution  
 B) Solid graphite  
 C) Solid sodium chloride  
 D) Gaseous carbon dioxide
52. The oxidation number of nitrogen in  $\text{HNO}_3$  is:  
 A) 4+ B) 5+  
 C) 6+ D) 7+
53. X is a salt that decomposed in water, what is the reason for its decomposition?  
 $\text{e}^- + \text{X}^{3+} \rightarrow \text{X}^{3+} \quad E_{\text{cell}} = 1.91\text{V}$   
 A) This potential oxidizes salt  
 B) This potential reduces salt  
 C) This potential reduces water  
 D) This potential oxidizes water
54. Methyl ketone can be characterized by performing:  
 A) Iodoform test B) Schiff's test  
 C) Benedict reagent test D) Tolle n's test  
 E) Cannizzaro's test
55. In RNA which of the base is replaced by uracil?  
 A) Cytosine B) Adenine  
 C) Guanine D) Thymine
56. In the atmosphere  $\text{CO}_2$  is about:  
 A) 0.01% B) 0.03%  
 C) 0.05% D) 0.09%
57. Chlorophyll, naturally occurring macromolecule contains:  
 A)  $\text{Mg}^{2+}$  B)  $\text{Al}^{3+}$   
 C)  $\text{Fe}^{3+}$  D)  $\text{B}^{3+}$
58. The reaction of below diagram with  $\text{RMgX}$  leads to the formation of:



	<ul style="list-style-type: none"> <li>• Sentence <i>His arrogance astounded her</i></li> <li>• <i>She was astounded by his arrogance</i></li> </ul> <p>Shashdar kar daina Hamratzada kar daina Darn bakhud kardama Achambe main daina Hakka bakka kar daina</p>	<ul style="list-style-type: none"> <li>• Flabbergasted (extremely surprised and/or shocked)</li> <li>• Dumbfound (to surprise or shock somebody so much that they are unable to speak)</li> <li>• Stupefy (stupefy somebody to surprise or shock somebody; to make somebody unable to think clearly)</li> <li>• Nonplus (surprised and confused so that you do not know what to do or say) - <i>He was rather nonplused by her question</i></li> </ul>	
3. APPARENTLY	<p>Bazahur Zahir tariqa say Ashkara tawar pei</p>	<ul style="list-style-type: none"> <li>• Allegedly</li> <li>• Supposedly</li> <li>• Reputedly</li> <li>• Ostensibly</li> <li>• Outwardly</li> </ul> <p>Seemingly</p>	<ul style="list-style-type: none"> <li>• Improbably</li> <li>• Unlikely</li> <li>• Dubiously</li> <li>• Equivocally</li> <li>• Questionable</li> <li>• Uncertain</li> </ul>
4. ATTACHED TO	<p>Ke sath munsalik</p>	<ul style="list-style-type: none"> <li>• Joined</li> <li>• Fastened</li> <li>• Affectionate</li> <li>• Towards</li> <li>• tender towards</li> </ul>	<p>avoid, differ, disagree, disapprove, disassociate, disconnect, oppose, refuse</p>
5. APPRAISED	<p>Qeenat ka andaza lagana Mol lagana Janchna Tasthis karna</p>	<ul style="list-style-type: none"> <li>• Assess</li> <li>• evaluate, estimate</li> <li>• judge</li> <li>• rate</li> <li>• gauge</li> </ul>	<p>ignore, neglect</p>
6. ALAS	<p>Alas</p>	<p>used to express grief, pity, or concern, woe, alack</p>	<p>as luck would have it, fortuitously, fortunately, luckily</p>
7. ABRUPTLY	<p>Achanak, yakayak</p>	<p>all of a sudden, precipitously, suddenly, unexpectedly</p>	<p>friendly, polite, expansive</p>
8. ACCENTUATED	<p>Zar danda</p>	<p>underline, underscore, accent, highlight, spotlight, foreground, feature</p>	<p>masked,</p>
9. ANXIETIES	<p>Iztarabat</p>	<p>worry, concern, apprehension, apprehensive ness, consternation</p>	<p>calmness, serenity</p>
10. BOON	<p>Sahoolat, Asani, Atya</p>	<p>blessing, godsend, bonus, good thing, benefit, help, aid, advantage</p>	<p>curse, disadvantage</p>
11. BEWILDERMENT	<p>Ghabrahat, Pareshani, Hairan</p>	<p>confusion, disorientation, perplexity, bafflement, dazediscombobulation</p>	<p>expectation, clarity</p>

Teezi say, Phen  
Chusti say

Moti, mala

To fill someth

Bharpoor, sa  
lab raiz, lab

Tears brimm  
eyes when sh

leaving

confused

Hairan kun,  
rada

Shy/embarra

Sharminda,  
Sharamsar

(Sar hilana,  
karna, isht  
bulana)

Creed

V)

COLLID

CONFRO

COMPE

CRUDE

COAXE

COMPR



## NUMS Entrance Test

## PHYSICS

1. All statements are correct about third law of motion except:
  - A) Forces have equal magnitude
  - B) Both of them have opposite direction
  - C) Both are applied on different bodies
  - D) Both are applied on same body maintaining equilibrium
2. A mass has constant acceleration, what is true about force applied on it
  - A) Constantly increasing
  - B) Constant but not zero
  - C) is directly proportional to the square of Displacement
  - D) is directly proportional to velocity
3. If temperature is increased from 200K to 800K then what would be the change in pressure at constant volume
  - A) Increase by factor 2
  - B) Decrease by factor 4
  - C) Increase by factor 2
  - D) Decrease by factor 2
4. If each particle of fluid is passing through same point, what would be the flow?
  - A) linear
  - B) streamline
  - C) tubular
  - D) both A and B
5. Density of blood is
  - A) more than water
  - B) less than water
  - C) nearly equal to water
  - D) 3 times greater than water
6. A body moving on a fluid will experience
  - A) drag force
  - B) centripetal force
  - C) centrifugal force
  - D) tubular force
7. If a substance can undergo plastic deformation until it breaks, it is
  - A) ductile substance
  - B) brittle substance
  - C) crystalline substance
  - D) polymeric substance
8. If stress is applied on a body, then the ratio of change in volume to original volume will be
  - A) polymeric strain
  - B) volumetric strain
  - C) parallel strain
  - D) tensile strain
9. If a wave can be polarized it means it is
  - A) longitudinal wave
  - B) stationary wave
  - C) superimposed wave
  - D) transversal wave
10. The electron \_\_\_\_ current is chiefly due to
  - A) cathode
  - B) grid
  - C) anode getter
  - D) screen
11. If wire having current 10A has 3t magnetic flux, what will be the magnetic field at double of the distance?
  - A) reduces by factor 2
  - B) reduces by factor 4
  - C) becomes double
  - D) becomes triple
12. What is true regarding magnetic force and magnetic intensity
  - A) if electrons movement is parallel to magnetic field, it will rotate clockwise
  - B) if electrons movement is parallel to magnetic field, it will rotate anticlockwise
  - C) if electron enters perpendicular to field force would be parallel to plane
  - D) if electron enters perpendicular to field force will be maximum
13. A real image formed by convex lens is always
  - A) erect
  - B) inverted
  - C) magnified
  - D) diminished
14. What is true about electric field and electric force
  - A) electric field lines are towards negative and e flow in same direction.
  - B) electric field lines are towards positive and electron flow in opposite direction
  - C) electric field lines are towards negative and e flow in opposite direction
  - D) electric field lines are towards positive and e flow in same direction
15. If electron passes through axis of solenoid the movement will be
  - A) towards the outward
  - B) towards the inward
  - C) parallel to its motion
  - D) no force acts on it
16. Ejection of  $e^-$  from the metal surface due to heating effect is
  - A) thermionic emission
  - B) photoelectric effect
  - C) population inversion
  - D) cathode expulsions
17. Newton's rings are result of
  - A) polarization
  - B) diffraction
  - C) reflection
  - D) refraction
18. If amplitude is 200, intensity is 300. When amplitude is increased to 800 then what will be intensity?

- Electric conduction is high in  
A) solid nuclei  
B) solid graphite  
C) If speed of waves is  $10\text{ m/s}$  and its frequency is  $5\text{ Hz}$ , find its wavelength  
D) If power is  $100\text{ watt}$  and voltage is  $220$ . Find its resistance
- Unit of gravitational constant  $G$  are  
A)  $\text{m s}^{-2}$   
B)  $\text{m s}^{-2}$   
C)  $\text{m s}^{-2}$   
D)  $\text{m s}^{-2}$
- Third law of Newton is also called  
A) Law of inertia  
B) Equilibrium  
C) Both A and B  
D) None
- the fractional change in resistance per kelvin is known as  
A) Temperature coefficient of resistance  
B) Thermal coefficient  
C) Linear coefficient of expansion  
D) Volume coefficient of expansion
- To convert Si crystal into p type semiconductor, which group element be doped?  
A) Trivalent element  
B) Second group element  
C) Four group element  
D) Pentavalent element
- The measuring part of the Avometer consists of  
A) number of low resistances connected  
B) At an angle of  $180$  degrees with the  
C) At an angle of  $45$  degrees with the galvanometer  
D) At an angle of  $90$  degrees with the galvanometer
- energy supplied by the cell to the charge carriers is derived from the conversion of  
A) chemical energy into chemical energy  
B) chemical energy into heat energy  
C) chemical energy into electrical energy  
D) chemical energy into electrical energy
- deviation of I-V graph from straight line is  
A) increase in temperature and decrease in  
B) decrease in temperature and increase in  
C) increase in temperature and increase in  
D) decrease in temperature and decrease in

29. The information received at the other end of the fiber can be inaccurate due to \_\_\_\_\_ of light signal  
A) Longer wavelengths  
B) Frequency  
C) Intensity  
D) Dispersion spreading
30. The pressure on the other sides and energy where inside the vessel will be same and according to the:  
A) Pascal's law  
B) Hook's law  
C) Boyle's law  
D) Charles's law
31. The value of universal constant " $R$ " is  
A)  $8.314\text{ Jmol}^{-1}\text{K}^{-1}$   
B)  $1.38\text{ Jmol}^{-1}\text{K}^{-1}$   
C)  $1.38\text{ Jmol}^{-1}\text{K}^{-1}$   
D)  $8.314\text{ Jmol}^{-1}\text{K}^{-1}$
32. For adiabatic process, the first law of thermodynamics is:  
A)  $W = \Delta U + Q$   
B)  $Q = -W$   
C)  $Q = W$   
D)  $W = -\Delta U$
33. The entropy of universe always  
A) Decreases  
B) Increases  
C) Remains the same  
D) Both A and B
34. If the body is rotating with uniform angular velocity, then its torque is  
A) Zero  
B)  $90$  degree  
C)  $1$   
D)  $-1$
35. The direction of the magnetic lines of force depends on  
A) Nature of material of conducting wire  
B) Area of conducting wire  
C) Amount of current  
D) Direction of current
36. A uniform magnetic field is represented by a set of lines of force which are:  
A) Parallel  
B) Divergent  
C) Convergent  
D) None of these
37. Weber ampere per meter is equal to  
A) Joule  
B) Watt  
C) Newton  
D) Henry
38. The difference between soft and hard X-rays is of:  
A) Velocity  
B) Intensity  
C) Frequency  
D) Polarization
39. Which of the following is an instrument for monitoring radiations?  
A) GM tube  
B) Geiger counter  
C) Wilson cloud chamber  
D) All of these

Ali Series

Unavoidable

Unavoidable

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D) Horrified

B) Interesting

D) Fair

D) Arching expression

61. FURTIVE

A) Furious

C) Secretive

B) Familiar

D) Easy

62. BURGEOIS

A) Belonging to bureaucratic class

B) Belonging to the middle class

C) Belonging to the upper class

D) Belonging to the lower class

63. RUMINATE

A) Eat greedily

C) Work lazily

B) Think carefully

D) Run fast

64. EMBELLISH

A) Adorn

C) Finish

B) Nominate

D) Weaken

65. PARABLE

A) Impossible

C) Allegory

B) Sociable

D) Suitable

## BIOLOGY

A) Of bones in skull

B) 26

D) 28

NADH produces how many ATPs?

B) 4 ATP

D) 6 ATP

How much amount of blood is pumped by each contraction?

B) 90ml

D) 125ml

Endography is related to

B) Liver

D) Eyes

Shape of tobacco mosaic virus is

B) Rod shaped

D) spherical shape

Enzyme used in

B) starch digestion

D) both A &amp; B

Amphibians heart has chambers

B) 3

D) 5

Plasma membrane is named so because it

surrounds

surrounds

surrounds

surrounds

surrounds

surrounds

surrounds

surrounds

surrounds

C) Nucleus

D) Ribosome

75. Groups of cells performing same function

A) organelles

C) System

B) Tissues

D) Both A and B

76. Amphibians live on

A) Water

C) Land

B) Water and land

D) Air

77. Mutation occur in

A) DNA

C) RNA

B) Protein

D) All of these

78. DNA is found in which of the following

A) Golgi complex

C) Mitochondria

B) lysosomes

D) ribosomes

79. Which enzyme present in stomach curdles the milk?

A) Rennin

C) Pepsin

B) trypsin

D) Lipase

80. Germ theory was given by

A) Robert Koch

B) Antoine van Leeuwenhoek

C) Robert Hook

D) Robert Brown

81. Hybrid black guinea pigs are crossed with each other, the resulting off springs will be

A) all black

C) 3 black 1 white

B) All white

D) 3 white 1 black

82. The enzyme in breast milk that causes the coagulation of milk or form precipitates of milk is

A) renin

C) amylase

B) trypsin

D) Lipase



83. The egg laying birds are  
A) oviparous B) Viviparous  
C) monotremes D) All
84. Which of the following have both external and internal digestion?  
A) hydra B) Planaria  
C) cockroach D) all
85. Milk drinking babies have an additional enzyme called  
A) renin B) amylase  
C) lipase D) None
86. Egg laying mammals are called  
A) prototheria B) Protozoa  
C) chordata D) Monotremes
87. Aerobic respiration results in how many ATP?  
A) 2 B) 36  
C) 18 D) 32
88. Which process takes place during the movement of glucose from body fluid to blood?  
A) endosmosis B) Osmosis  
C) active transport D) facilitated diffusion
89. Ecological succession starting from dry lands is  
A) xerosere B) Hydrophytes  
C) halophytes D) All
90. Organs of voice in bird  
A) larynx B) Pharynx  
C) sphinx D) Both a and c
91. Treponema palladium causes  
A) syphilis B) Gonorrhea  
C) AIDS D) Herpes
92. Lamarck is best known for his theory of  
A) inheritance  
B) Dominance  
C) inheritance of acquired characters  
D) all of above
93. Commercial method of producing millions of seedlings in limited time?  
A) parthenogenesis B) Parthenocarp  
C) cutting D) grafting
94. Cell wall is synthesized by  
A) cellulose B) Cell  
C) ribosomes  
D) Penicillin binding protein
95. In tissues culture cells are held together by;  
A) Callus B) Adhesives  
C) Both D) None
96. Thyroid gland requires high amount of;  
A) Phosphate B) Calcium  
C) Iodine D) Sodium

97. Which of the following is not a function of cerebrum?  
A) Volunteer digestion B) Thinking  
C) Intelligence D) Skeletal muscle
98. Which of the following is the function of adrenal?  
A) To increase breathing rate  
B) To increase heart rate  
C) To increase calcium rate  
D) Both A and B
99. Antibodies are usually;  
A) Globular proteins B) Glycoproteins  
C) Fibrous D) Glycolipids
100. Hepatic and pancreatic secretions are stimulated by hormone called;  
A) Gastrin B) Secretin  
C) Insulin D) Glycolipid
101. the respiratory pigments, which has much high affinity to combine oxygen is;  
A) Myoglobin B) Globin  
C) Hemoglobin D) Hemocyanin
102. Coelom is a cavity lined by;  
A) Mesoderm B) Endoderm  
C) Epiderm D) Ectoderm
103. It is an endoparasite of human's cattle and that completes its life cycle in two hosts;  
A) Tape worm B) Aurelia  
C) Liver fluke D) Planaria
104. The Gymnosperms are called "naked seeded plants because they bear naked;  
A) Antheridia B) Ovules  
C) Fruits D) Archegonia
105. Immediate source of energy for cellular respiration is;  
A) Lipids B) ATP  
C) Proteins D) Carbohydrates
106. Hemoglobin exhibits;  
A) Secondary structure  
B) Primary structure  
C) Quaternary structure  
D) Tertiary structure
107. Arteriosclerosis is;  
A) A metabolic disorder  
B) An infection disorder  
C) A degenerative disorder  
D) A nutritional deficiency
108. when phenotype of a heterozygote is in between the phenotypes of both homozygous parents, it is called;  
A) Incomplete dominance  
B) Epistasis

119. All Series
120. which of the is a fresh water sponge?
121. pseudo coelom is actually derived from:
122. the molecule used by most of the animal for long term energy storage is:
123. the process of swallowing is controlled by:
124. humans are;
125. The spinal nerves are functionally:
126. The major constituent of contraceptive pill is:
127. T-lymphocytes are matured in thymus glands; they are produced in;
128. The chemical nature of antibody is:
129. The 1<sup>st</sup> human hormone produced by recombinant DNA technology was;
130. The wings of birds and the fore-leg of a horse is - structures.
131. The first simplest oxygen producing organism;
132. \_\_\_\_\_ are more common in human males than females;

- A) Eulagen strain D) Safranin
- A) Sycon B) Eucosolema
- C) Euplectella D) Spongilla
- A) Blastocoel B) Coelostome
- C) Neutocoel D) Haemocoel
- A) Glycogen B) Starch
- C) Fat D) Cholesterol
- A) Hypothalamus
- B) Hormones
- C) Medulla oblongata
- D) Sympathetic nervous system
- A) Ammonotelic B) Ureotelic
- C) Uricotelic D) None of these
- A) Sensory nerves B) Motor nerves
- C) Mixed nerves D) Unknown
- A) Oestrogen B) Progesterone
- C) Prolactin D) Testosterone
- A) Thymus gland B) Bone marrow
- C) Pancreases D) Heart
- A) Glycoprotein B) Glycolipids
- C) Lipoproteins D) Polysaccharides
- A) Oestrogen B) Testosterone
- C) Cartisone D) Insulin
- A) Analogous B) Homologous
- C) Vestigial D) Evolutionary
- convergent
- A) Methanogens B) Cyanobacteria
- C) Euglena D) Spirogyra
- A) X-linked dominant traits
- B) X linked recessive traits
- C) Y-linked dominant traits
- D) Autosomal linked recessive

133. Treatment of heredity disorders by gene manipulation is called;  
 A) Biotechnology  
 B) Genetic engineering  
 C) Gene therapy  
 D) None of these
134. A trait whose alleles are present in both male and female but express more in one sex than other;  
 A) Sex linked trait  
 B) Sex limited trait  
 C) Sex influenced trait  
 D) X linked trait
135. What is the name of the following compound?



- A) 1-Ethyl-3,4-dimethylcycloheptane.  
 B) 2-Ethyl-4,5-dimethylcyclohexane  
 C) 1-Ethyl-3,4-dimethylhexane  
 D) 4-Ethyl-1,2-dimethylcyclohexane
136. Which of the following compound possesses single covalent bond?  
 A)  $\text{CH}_4$   
 B)  $\text{C}_2\text{H}_4$   
 C)  $\text{C}_2\text{H}_2$   
 D) All of these
137. Which of the following carboxylic acids would be more acidic?  
 A)  $\text{CH}_3\text{CHClCH}_2\text{COOH}$   
 B)  $\text{CH}_3\text{CH}_2\text{CHClCOOH}$   
 C)  $\text{CH}_3\text{CH}_2\text{CHClCOOH}$   
 D)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$
138. Which of the following compounds cannot be used to convert butanoic acid to butanol?  
 A)  $\text{PCl}_3$   
 B)  $\text{CCl}_4$   
 C)  $\text{PCl}_5$   
 D)  $\text{SOCl}_2$
139. Which of the following reagents will reduce butanoic acid to butanol?  
 A)  $\text{LiAlH}_4$   
 B)  $\text{LiAlH}_4 \cdot \text{H}_2\text{O}$   
 C)  $\text{Mg}(\text{BH}_4)_2$   
 D) all of these
140. The equation shows the reaction between element X and in compound  $\text{XCl}_2$ .  

$$\text{X}_{(s)} + 2\text{HCl}_{(aq)} \rightarrow \text{XCl}_{2(aq)} + \text{H}_{2(g)}$$
  
 Which type of bonding are present in element X and in compound  $\text{XCl}_2$ ?  
 A) Covalent Covalent  
 B) Covalent/Ionic

- C) Metallic Covalent  
 D) Metallic Ionic
141. Which of the following has the highest electrical conductivity?  
 A) Aqueous sugar solution  
 B) Solid sodium chloride.  
 C) Solid graphite  
 D) Gaseous carbon dioxide.
142. Part of a polymer molecule has the following structure.  

$$-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-$$
  
 A)  $\text{C}_2\text{H}_4$   
 B)  $\text{C}_2\text{H}_6$   
 C)  $\text{C}_3\text{H}_6$   
 D)  $\text{C}_3\text{H}_8$
143. The common features among the species  $\text{CN}^-$  and  $\text{NO}^+$  are;  
 A) Bond order three and isoelectric.  
 B) Bond order three and weak ligands.  
 C) Bond order two and  $\pi$ -accepters.  
 D) Isoelectronic and weak field ligands.
144. Which of the following is the electronic configuration of  $19\text{K}$ ?  
 A)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2$   
 B)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^1$   
 C)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$   
 D)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}$
145. At equilibrium which of the following reactions is not effected by pressure?  
 A)  $\frac{1}{2} \text{N}_{2(g)} + \frac{1}{2} \text{H}_{2(g)} \rightleftharpoons \text{NH}_{3(g)}$   
 B)  $2\text{NO}_{2(g)} \rightleftharpoons \text{N}_2\text{O}_{4(g)}$   
 C)  $\text{PCl}_{5(g)} \rightleftharpoons \text{PCl}_{3(g)} + \text{Cl}_{2(g)}$   
 D)  $\text{SO}_2\text{Cl}_{2(g)} \rightleftharpoons \text{SO}_{2(g)} + \text{Cl}_{2(g)}$
146. "The sum of all the exponents to which the mole concentration in terms in the rate equation are raised" defines:  
 A) Rate of the reaction  
 B) Order of the reaction.  
 C) Type of the reaction.  
 D) Product of the reaction.
147.  $\text{H}_2$  and  $\text{Cl}_2$  do not react in the dark, but in the presence of light a vigorous reaction is initiated due to the formation of:  
 A) Hydrogen free radical.  
 B) Chlorine free radical.  
 C) Hydrogen chloride molecule  
 D) Both A and B.
148. The rate of a gaseous reaction is given by rate  $k[\text{A}][\text{B}]$ . If the volume of the vessel containing these gases reduced to  $1/4^{\text{th}}$  of the initial volume the rate of reaction relative to the original rate would be;



B) 1/16

D) 1/8

154. Solid NaCl is a bad conductor of electricity because?

A) Solid NaCl is covalent

B) In the solid state, there are no ions

C) In solid NaCl, there is no migration of ions.

D) In solid NaCl, there are not electrons.

155. For a second order reaction, if concentration of reactants increases by 3 times then the rate will increase by:

A) 2 times

B) 3 times.

C) 4 times

D) Unchanged

156. In an adiabatic process:

A) Pressure is maintained constant.

B) The gas is isothermally expanded

C) There is perfect heat insulation.

D) System exchanges heat with the surrounding.

157. Enthalpy of a compound is equal to its:

A) Heat of combustion.

B) Heat of formation.

C) Heat of solution.

D) Heat of dilution.

158. A mixture of ethyl and isopropyl iodides is heated with Na in dry ether. According to Wurtz reaction the product(s) obtained is/are?

A)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

B)  $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$

C)  $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)_2$

D) All of the above.

159. 3 moles of ethanol are reacting with 1 mole of PBr<sub>3</sub> to form 3 moles of bromoethane and 1 mole of X. Which of the following is X?

A)  $\text{H}_3\text{PO}_4$

B)  $\text{H}_3\text{PO}_2$

C)  $\text{H}_3\text{PO}_3$

D)  $\text{H}_3\text{PO}_4$

160. The conversion of phenol to benzene in the presence of zinc involves:

A) Oxidation

B) Reduction

C) Dihydroxylation

D) Dehydrogenation

161. Phenyl methyl ketone can be converted into ethyl benzene in one step by using:

A)  $\text{AlH}_3$

B)  $\text{Zn(Hg)}-\text{HCl}$

C)  $\text{NaBH}_4$

D)  $\text{C}_6\text{H}_5\text{MgI}$

162. Which of the following will not undergo aldol condensation?

A) Acetaldehyde.

B) Propanaldehyde

C) Benzaldehyde

D) Dimethyl acetaldehyde

158. Treatment of propionaldehyde with dil. The NaOH solution gives:

A)  $\text{CH}_3\text{CH}_2\text{COOCH}_3$

B)  $\text{CH}_3\text{CH}_2\text{CH(OH)CH}_2\text{CH}_2\text{CHO}$

C)  $\text{CH}_3\text{CH}_2\text{CH(OH)CH(CH}_3\text{)CHO}$

D)  $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_2\text{CHO}$

159. Which of the following solids is an example of substance with a macromolecular structure?

A) Aluminum chloride.

B) Ice.

C) Magnesium oxide.

D) Silicon (IV) oxide.

E) Sodium chloride.

160. Which of the following statement is true?

A) All nitrites of group II metals are decomposed by to give oxides of  $\text{NO}_2$ .

B) Aqueous sodium nitrite is acidic to litmus.

C) Aqueous ammonium nitrate is alkaline to litmus.

D) The alkali metals nitrites are insoluble in water.

E) The tendency to form complex ions.

161. Which of the following pair of substance react together forming an organic product that gives a neutral solution in water?

A)  $\text{CH}_3\text{CO}_2\text{H}$  and  $\text{NaOH}$

B)  $\text{C}_6\text{H}_5\text{OH}$  and  $\text{Na}$

C)  $\text{C}_6\text{H}_5\text{NH}_2$  and  $\text{HCl}$

D)  $\text{CH}_3\text{CO}_2\text{H}$  and  $\text{PCl}_5$

E)  $\text{CH}_3\text{COCH}_3$  and  $\text{LiAlH}_4$

162. A solid compound X dissolved readily in water to give a weakly alkaline solution. On evaporation of the water X was discovered unchanged which one of the following could X?

A)  $\text{CH}_3\text{NH}_2\text{H}_3\text{Cl}$

B)  $\text{CH}_3\text{ONa}$

C)  $\text{C}_6\text{H}_5\text{ONa}$

C)  $\text{C}_6\text{H}_5\text{NH}_2$

D)  $\text{H}_2\text{NCH}_2\text{CO}_2\text{H}$

163. An azeotropic mixture of two liquid has a boiling point higher than either of them when it

A) Show positive deviation from Raoult's law

B) Show negative deviation from Raoult's law

C) Show ideal behavior

D) Is saturated

164. The osmotic pressure of equimolar solutions of  $\text{BaCl}_2$ ,  $\text{NaCl}$  and sucrose will be in order

A)  $\text{Sucrose} > \text{NaCl} > \text{BaCl}_2$

B)  $\text{Sucrose} > \text{BaCl}_2 > \text{NaCl}$

C)  $\text{NaCl} > \text{BaCl}_2 > \text{sucrose}$

D)  $\text{BaCl}_2 > \text{NaCl} > \text{sucrose}$

165. Impurities of lead in silver are removed by

- A) Parke's process
- B) Cyanide process
- C) Solvay process
- D) Amalgamation process

166. Chromium dissolve in dilute  $H_2SO_4$  to form  $[Cr(H_2O)_6]^{2+}$ , the color of the ion is

- A) Blue
- B) Yellow
- C) Brown
- D) Pink

167. Which of the following will react with water?

- A)  $CHCl_3$
- B)  $CH_3CHO$
- C)  $Cl_2$
- D)  $ClCH_2CH_2Cl$

168. In reaction of m-chloro toluene with  $KNH_2$  in liquid  $NH_3$  the major product is

- A) O-toluidine
- B) M-toluidine
- C) P-toluidine
- D) P-chloro toluene

169. Ascorbic acid (vitamin C) contain 40.92% carbon, 5.58% hydrogen and 54.5% of oxygen by mass. what is the empirical formula of ascorbic acid?

- A)  $C_5H_4O_3$
- B)  $C_6H_8O_6$
- C)  $CH_4O_3$
- D)  $C_7H_6O_3$
- E)  $C_5H_6O_3$

70. The order of reactivities of the following alkyl halides for a  $Sn^{2+}$  reaction is

- A)  $RF > RCl > RBr > RI$
- B)  $RF > RBr > RCl > RI$
- C)  $RCl > RBr > RI > RF$
- D)  $RI > RBr > RCl > RF$

71. Natural rain forms \_\_\_\_\_ in the presence of carbon dioxide in the air

A) Smog

C) Carbonic acid

B) Ozone

D) Chlorofluorocarbon

172. The major source of unburnt hydrocarbon in atmosphere is.

- A) Petroleum
- C) Automobiles

B) Natural Gas

D) Human beings

173. Among the most abundant biomolecules \_\_\_\_\_ most abundant one on earth.

- A) Protein
- C) Lipids

B) Carbohydrates

D) Vitamin

174. Genetic mutation occurs in.

- A) RNA
- C) DNA

B) Protein

D) All of these

175. Enzymes that are functional within the cell are called

- A) Endoenzymes
- C) Holoenzymes

B) Exoenzymes

D) Both A and C

176. Which of the following fertilizers has maximum percentage of nitrogen in solid state?

- A) Diammonium hydrogen phosphate
- B) Urea
- C) Ammonia
- D) Ammonium nitrate

177. To avoid the formation of toxic compounds with chlorine which substance is used for disinfection of water

- A)  $KMnO_4$
- B)  $O_3$

B) Chloramines

D) Alums

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## KEY

1. D	37. B	73. A	109. D	145. A
2. D	38. C	74. A	110. C	146. B
3. A	39. C	75. B	111. B	147. B
4. D	40. D	76. B	112. C	148. A
5. A	41. D	77. A	113. B	149. C
6. A	42. A	78. .	114. D	150. .
7. D	43. B	79. C	115. D	151. C
8. D	44. D	80. A	116. A	152. B
9. D	45. D	81. C	117. B	153. D
10. A	46. B	82. A	118. A	154. D
11. D	47. A	83. A	119. D	155. B
12. B	48. A	84. A	120. D	156. B
13. C	49. D	85. A	121. A	157. C
14. A	50. A	86. D	122. C	158. C
15. C	51. A	87. B	123. C	159. D
16. B	52. A	88. C	124. B	160. A
17. C	53. C	89. A	125. C	161. E
18. A	54. A	90. A	126. B	162. C
19. C	55. B	91. A	127. B	163. B
20. B	56. D	92. C	128. A	164. D
21. C	57. C	93. C	129. D	165. A
22. C	58. C	94. B	130. B	166. A
23. A	59. B	95. A	131. B	167. B
24. A	60. A	96. C	132. B	168. C
25. A	61. C	97. A	133. C	169. A
26. B	62. B	98. D	134. C	170. D
27. A	63. B	99. A	135. D	171. C
28. D	64. A	100. B	136. D	172. A
29. B	65. C	101. C	137. B	173. B
30. A	66. A	102. A	138. B	174. C
31. D	67. A	103. C	139. A	175. A
32. D	68. A	104. D	140. D	176. B
33. B	69. D	105. B	141. C	177. C
34. A	70. .	106. C	142. A	
35. D	71. .	107. A	143. A	
36. A	72. C	108. D	144. C	



## BIOLOGY

1. Which one of the following animals possesses an open circulatory system?  
A) Amoeba B) Earth worm  
C) Grass hopper D) Man
2. The gametophyte of Ulva is:  
A) Haploid B) Diploid  
C) Triploid D) Polyploidy
3. Its membranes are the sites where sunlight energy's trapped and where all is formed refers to:  
A) Chloroplast B) Leucoplast  
C) Chromoplast D) Cytosol
4. All of the following are bacterial diseases except:  
A) Cholera B) Tuberculosis  
C) Typhoid D) Poliomyelitis
5. The genetic material of plant viruses mostly is:  
A) DNA B) RNA  
C) Both A and B D) Proteins
6. The social organization of howling monkeys was studied by:  
A) Allen B) Thorpe  
C) Schleiden D) Carpenter
7. The flower of family gramineae process contains two scales below ovary Which are called:  
A) Glumes B) Lemma and pales  
C) Lodicule D) Rachilla
8. The total of all the allele in population is called:  
A) Genetic drift B) Genotype  
C) Gene pool D) Gene mutation
9. The cells that play vital role in the differentiation of various body parts are called:  
A) Ectodermal cells B) Mesodermal cells  
C) Endodermal cells D) All of the above
10. Fibrinogen is necessary for:  
A) Metabolism B) Blood clotting  
C) Reproduction D) Respiration
11. It looks like a single flower but it is in fact an inflorescence called:  
A) Pencil B) Typical raceme  
C) Compound umbel D) Capitulum
12. A cross between F1 hybrids with either of parents is called:  
A) Back cross B) Test cross  
C) Reverse cross D) None of the above
13. Which one of following is a true fish?  
A) Cuttle fish B) Silver fish  
C) Jelly fish D) Sea fish
14. Fibrinogen is necessary for:  
A) Metabolism B) Blood clotting  
C) Reproduction D) respiration
15. Filter feeders extract food particles from:  
A) Water B) Soil  
C) Air D) Blood
16. Which one of the following is homeothermy animal?  
A) Uromastix B) Salamander  
C) Sea horse D) Kangaroo
17. The individual with hare lip shows which of the following conditions?  
A) Hard palate B) Polydactyl  
C) Cleft Palate D) Microcephaly
18. Which hormone prepares the body for situations of stress and emergency?  
A) Adrenaline B) Non adrenaline  
C) Thyroxin D) Insulin
19. Peptide bond is formed between:  
A) Hydrogen groups of adjacent amino acids  
B) Functional group of the amino acids  
C) Carboxyl group and amino group  
D) Functional group and hydrogen group of adjacent amino acid
20. The term bivalent mean:  
A) Two chromatids  
B) Two chromosomes  
C) Four chromatids  
D) Four chromosomes
21. All of the following structures are proteinous in nature except:  
A) Hooves B) Haemoglobin  
C) Enzymes D) Steroids
22. Most favorite host cell of HIV-Virus is:  
A) Lymphocytes B) RBC  
C) T-cell D) B-cells
23. Sunken stomata are found in:  
A) Mesophytes B) Xerophytes  
C) Halophytes D) Hydrophytes
24. The mammals term connecting link between reptilian and mammals:  
A) Marsupials B) Eutherians  
C) Monotremes D) Metatherians
25. In which of the following book lungs are found?  
A) Clam worm B) Spider  
C) Silver fish D) Leech
26. Hydra reproduces asexually by:

1. Binary fission  
2. Budding  
3. During cellular respiration NADH<sub>2</sub> produces:  
A) 2 ATP  
B) 3 ATP  
C) 4 ATP  
D) 5 ATP
4. An individual has an additional sex chromosome which syndrome does it refer to?  
A) Down's syndrome  
B) Turner's syndrome  
C) Klinefelter's syndrome  
D) Karyotype's syndrome
5. HIV is also known as:  
A) AIDS  
B) HAV  
C) HTLV  
D) HBV
6. Smaller the animals:  
A) More rate of respiration  
B) Less the rate of respiration  
C) Rate of respiration has nothing to do with the size of animal  
D) None of these
7. Nicotine in tobacco:  
A) Decreases the heart rate  
B) Decreases the blood pressure  
C) Block the transport of oxygen  
D) Paralyzes cilia
8. Stroma of chloroplast carries the fixation of:  
A) Nitrogen  
B) Oxygen  
C) Carbon monoxide  
D) Carbon dioxide
9. The valve between right atrium and right ventricle is called:  
A) Bicuspid valve  
B) Tricuspid valve  
C) Pulmonary valve  
D) Semi lunar valve
10. Anthocyanin's are various types of colorful pigments present in the:  
A) Chloroplasts  
B) Chromoplasts  
C) Vacuoles  
D) None of these
11. Antibodies are produced by:  
A) Red blood cells  
B) Platelets  
C) White blood cells  
D) Hormones
12. Which of the following scientists contributed a lot to "modern synthetic theory of organic evolution"?  
A) Charles Darwin 1859  
B) Gregor Mendel 1866  
C) Thomas Mather 1909  
D) R. A. Fisher 1930

37. Flow of energy in an ecosystem is:  
A) Unidirectional  
B) Bidirectional  
C) Multidirectional  
D) All of these
38. When a child with blood group I<sub>A</sub>I<sub>a</sub> is born of a woman with genotype I<sub>a</sub>I<sub>a</sub>, then the father of child could not be a man of the genotype:  
A) I<sub>A</sub>I<sub>A</sub>  
B) I<sub>A</sub>I<sub>a</sub>  
C) I<sub>a</sub>I<sub>a</sub>  
D) I<sub>A</sub>I<sub>A</sub>
39. Which of the following amino acids has single codon?  
A) Isoleucine  
B) Tryptophan  
C) Valine  
D) Arginine
40. Poliomyelitis normally affects the:  
A) Legs  
B) Brain  
C) Spinal cord  
D) Both B and C
41. Who experimented with dissected leg of a frog?  
A) Volta  
B) Jenner  
C) Salk  
D) Galvani
42. Synaptonemal complex helps in:  
A) Gamete formation  
B) Recombination during cell division  
C) Production of enzymes during cell division  
D) Chromosomal movement towards pole
43. Amniotic fluid in human embryo protects it from:  
A) Degeneration  
B) Jerks  
C) Encasement  
D) None of these
44. An analysis of chromosomes in a big city revealed the presence of four types of rather rare human being Whose sex chromosome compositions are mentioned in the list-I. They are phenotypically either male M or female as recorded in list-II, Match list-I chromosome composition with list-II sex and select the correct phenotypic sex using the codes given below the lists.

List I	List II
Chromosome	Composition
A. XO	Male M
B. XXXY	Female F
C. XYY	
D. XXX	

- A) 1212  
B) 2112  
C) 1121  
D) 1221

45. Bipinnaria is the larval form of:

- A) Coelenterate B) Polychaeta  
C) Echinodermata D) Cestoda  
E) None of these
46. Normally body temperature of man is 98.6-degree Fahrenheit but of rabbit is:  
A) 96°F degree Fahrenheit  
B) 98°F degree Fahrenheit  
C) 99°F degree Fahrenheit  
D) 100°F degree Fahrenheit
47. When frog is kept in water for some time it sheds a thin covering of skin which is:  
A) Cuboidal epithelium  
B) Squamous epithelium  
C) Columnar epithelium  
D) Ciliated epithelium
48. Gene mutation takes place in:  
A) Ribosomes  
B) chloroplast  
C) Deoxyribose nuclei acid  
D) None of them
49. When liver fat content of our body  
A) Fatty liver B) Necrosis liver  
C) Jaundice D) None of these
50. In fatty liver the fat contents are:  
A) 1 to 2 % B) 4 to 5 0/0  
C) 30 to 40% D) 10 to 15%
51. Which one of the following coelenterate is also called Portuguese man of war?  
A) Hydra B) Velella  
C) Obelia D) physalis  
E) None of them?
52. Pseudo coelomate animals are:  
A) Coelenterates B) Nematodes  
C) Arthropods D) Annelids  
E) None of them
53. Earth worm belongs to:  
A) Phylum Platyhelminthes  
B) Nematode  
C) Mollusca  
D) Arthropoda  
E) None to them
54. The primary oocyte in mammals has which of the following structures around it:  
A) Zona pellucida B) Zona vasculosa  
C) Corona radiata D) None of them
55. Membrane granule is found in which of the mammalian oocytes?  
A) Primary B) Secondary  
C) Both A and B D) None of these
56. Female rabbits are:

- A) induced ovulators  
B) spontaneous ovulators  
C) seasonal ovulators  
D) indifferent ovulators
57. Opposable thumbs are characteristic feature of  
A) Lagomorpha B) primates  
C) Edentate D) None of these
58. Differences in the scales of fishes and reptiles and reptiles lies in them being:  
A) Endodermal and dry  
B) Epidermal and dry  
C) Epidermal and wet  
D) endodermal and wet
59. Which of the following has oxygenated blood?  
A) Renal veins  
B) Pulmonary artery  
C) Hepatic portal veins  
D) None
60. Scapula is the bone of:  
A) Skull B) Pelvic girdle  
C) Pectoral girdle D) Vertebral column  
E) None
61. All the structure associated to digestive tract is originated in vertebrates by:  
A) Ectoderm B) Endoderm  
C) Mesoderm D) none of these
62. Ammonia is chief excretory product in:  
A) Reptiles B) Turtles  
C) Mammals D) Fish  
E) None of these
63. Archaeopteryx is an connecting link between:  
A) Amphibians and reptiles  
B) Reptiles and birds  
C) Birds and mammals  
D) None of these
64. Lamarck's theory of evolution is based upon:  
A) Effect of environment  
B) use and disuse of body parts  
C) Inheritance of acquired characters  
D) All of these  
E) None of these
65. Absorption of digested food occurs mainly in:  
A) Colon B) small intestine  
C) None of them D) stomach
66. Flame cells are commonly found in:  
A) Platyhelminthes B) Annelida  
C) Coelenterate D) All of above
67. The number of vertebrae in horse neck  
A) 5 B) 6  
C) 7 D) 10



C) Molluscs

D) None of these

NUMS Chemistry

- Chlorine upon reaction with NaOH in cold yields:
  - $\text{NaCl} + \text{NaClO} + \text{H}_2\text{O}$
  - $\text{NaCl} + \text{NaClO}_3 + \text{H}_2\text{O}$
  - $\text{NaClO} + \text{NaClO}_2 + \text{H}_2\text{O}$
  - $\text{NaCl} + \text{H}_2\text{O}$
- Farming salt is:
  - $\text{NaCl}$
  - $\text{HF}$
  - $\text{KHF}_2$
  - $\text{KClO}_3$
- Which of the following is least polarizable?
  - Ne
  - He
  - Xe
  - Kr
- Transfer of heat from hot surrounding to cold refrigerator is an example of:
  - Spontaneous reaction
  - Non Spontaneous reaction
  - First law of thermodynamics
  - All of above
- Alkaline  $\text{KMnO}_4$  converts ethylene into:
  - Methanol
  - Ethanol
  - Ethane
  - Ethylene glycol
- Which one of the following is not an isotope of hydrogen?
  - Deuterium
  - Tritium
  - Ortho hydrogen
  - None of these
- Blue litmus turn reds in a solution of pH.
  - Below 7
  - Above 7
  - Below 7
  - at all 7
- Maximum ionization potential is of:
  - Ca
  - Na
  - Be
  - D)
- Strongest acid among the following is:
  - $\text{CCl}_3\text{COOH}$
  - $\text{CH}_3\text{COOH}$
  - $\text{CF}_3\text{COOH}$
  - $\text{CBr}_3\text{COOH}$
- Which molecule is planar?
  - $\text{SF}_4$
  - $\text{XeF}_4$
  - $\text{NF}_3$
  - $\text{SiF}_4$
- A certain radioactive isotope has left behind after 100 days will be:
  - 125%
  - 25%
  - 50%
  - 100%
- The Cr.m.s. speed at NTP of a gas can be
  - Under root 3 P/d
  - Under Root 3PV M
  - under root 3RT/M
  - All of above
- Prussian blue is:
  - $\text{K}_2[\text{Fe}(\text{CN})_6]$
  - $\text{K}_4[\text{Fe}(\text{CN})_6] \cdot 3\text{H}_2\text{O}$
  - $\text{K}_4[\text{Fe}(\text{CN})_6]$
  - $\text{K}_3[\text{Fe}(\text{CN})_6]$

least distance vision for a person of hypermetropia is:

- less than 25 cm
- infinity

The nerve center for sight

- cerebral cortex
- None of these

On land frogs are:

- Myopic
- None of these

The sense organs of taste in tongue are known

as

- tactile receptors
- chemoreceptors
- gustatory receptors
- all of these

process of cartilage formation is known as

as

- chondrocytes
- chondrocytosis
- chondrogenesis
- None of these

significant flight muscles in birds is:

as

- Pectoral
- Tensor
- Appendicular
- None of these

Which of the following concepts is attributed to Lamarck?

as

- struggle for existence
- survival of the fittest
- inheritance of acquired characters
- cells come from pre-existing cells

Which of the following theories of evolution can best explain the vestigial organs

as

- darwinism
- Lamarckism
- natural selection
- Special creation

Food is assimilated into the body from digestive tract as:

as

- Proxus
- Stomach
- Intestine
- Rectum

Which of the following is included in:

as

- Reptiles
- Mammals
- Birds
- Mollusca

Which of the following is an example of ecosystem:

as

- Complete
- In complete
- None of these
- Partial complete

Despite the structural diversities they are characterized by having soft body protected by calcareous shell developing from the mantle

B) Foraminiferous

14. Which of the following are the fundamental ways of transferring energy?  
 A) Pressure and work  
 B) Volume and pressure  
 C) Heat and work  
 D) Pressure and heat
15. A mixture of camphor and benzoic acid can be separated by:  
 A) Fractional crystallization  
 B) Sublimation  
 C) Chemical method  
 D) Extraction with solvent
16. Diameter of an atom is in the range of?  
 A) 0.2m  
 B) 0.2 nm  
 C)  $2 \times 10^{-10}$  nm  
 D) 0.2 pm
17. The relative abundance of ion with a definite m/e value is measured by?  
 A) Quantity of fast-moving electrons  
 B) High pressure of vapors  
 C) Strength of electric current measured  
 D) Electron gas
18. 0.078 g of a hydrocarbon occupies 22.414 ml of volume at S.T.P. the empiric formula of hydrocarbon is CH. The molecular formula of hydrocarbon is?  
 A)  $C_2H_2$   
 B)  $C_2H_4$   
 C)  $C_4H_6$   
 D)  $C_6H_6$
19. Identify correct statement.  
 A) Element sodium can be prepared and isolated by electrolyzing an aqueous solution NaCl  
 B) Elemental Na is strong oxidizing agent  
 C) Elemental Na is insoluble in  $NH_3$   
 D) Elemental Na is easily oxidized
20. Which of the following statements is true? A) Alkali metal hydroxides are stable to heat except KOH  
 B)  $Ca(OH)_2$  is a stronger base than NaOH  
 C) When NaOH is made, the gas released at the cathode is  $Cl_2$   
 D) NaOH is named as caustic soda because it reacts with fats to form soap
21. The substance which conducts electricity by the movement of ions:  
 A) Graphite  
 B) Copper  
 C) Molten NaCl  
 D) Mercury
22. Point out the property which is not characteristic of alkali metal:  
 A) Low electronegativity  
 B) Low melting point  
 C) Their ions are isoelectronic with  
 D) High ionization energy
23. Metal belonging to the same group in the periodic table:  
 A) Magnesium and Na  
 B) Magnesium and Copper  
 C) Magnesium and Barium  
 D) Magnesium and Potassium
24. Magnesium keep on burning in:  
 A)  $N_2$   
 B)  $CO_2$   
 C)  $N_2O$   
 D)  $N_2$  as well as  $CO_2$
25. Red lead is:  
 A)  $PbO$   
 B)  $Pb_2O_3$   
 C)  $Pb_3O_4$   
 D)  $Pb_2O_4$
26. Solid  $CO_2$  dry ice has a structure just like:  
 A) Diamond  
 B) Sulphur  
 C) Graphite  
 D) None of these
27. Silicon is found in nature in form of:  
 A) Isolated or free silicon  
 B) Sulphides  
 C) Silica or silicates  
 D) Only silicates
28. Choose the correct statement:  
 A) Diamond is the hardest and graphite is softest  
 B) Graphite is the hardest while lamp black is softest  
 C) Coal is the hardest and coke is softest  
 D) Diamond is the hardest and coke is softest
29. Which one is an not organic compound?  
 A) Fats  
 B) Carbohydrates  
 C) Water  
 D) None
30. The isomers due to the unequal distribution of carbon atoms on either side of the Functional group belonging to the same homologous series are called:  
 A) Functional isomers  
 B) Position isomers  
 C) Chain isomers  
 D) Metamers
31. The active part in organic molecules is called:  
 A) Homologous series  
 B) Functional group  
 C) Chemical bonding  
 D) Ionic complex
32. The four bonds of carbon in methane are directed towards the corners of:  
 A) Cube  
 B) Pentagon  
 C) Hexagon  
 D) Tetrahedron
33. Which of the following compounds will form a hydrocarbon on reaction with Grignard reagent?  
 A)  $CH_3CH_2OH$   
 B)  $CH_3COCl$   
 C)  $CH_3COCH_3$   
 D)  $CH_3CHO$
34. Acetylene on reacting with ammonium silver nitrate gives.  
 A) Silver metal  
 B) Silver mirror  
 C) Silver acetylide  
 D) Silver acetate
35. Aromatic compounds burn with a sooty flame because:  
 A) They are resistant to react with oxygen  
 B) They have a cyclic structure  
 C) They have high percentage of Carbon  
 D) They high percentage of Hydrogen

- 4.4 Ali Series
1. Resonance structure of a molecule:  
 a) Pairing scheme should be same  
 b) Same energy  
 c) Arrangement of atom should be same  
 d) All are true
2. Ester is prepared by:  
 a) Two alcohols  
 b) Carboxylic acid and alcohol  
 c) Ketone and alcohol  
 d) Aldehyde and alcohol
3. Which of the following does not give Iodoform test?  
 a) Ethanol  
 b) Ethanal  
 c) Benzophenone  
 d) Benzophenone
4. Which of the following molecules has double bond?  
 a)  $C_2H_4$   
 b)  $C_2H_2$   
 c)  $C_2H_6$   
 d)  $NH_3$
5. Ionic radius in period from left to right:  
 a) Decreases  
 b) Increases  
 c) Increase and then decrease  
 d) Decreases and then increases
6. Which of the following molecules has no net dipole moment?  
 a)  $HCl$   
 b)  $H_2O$   
 c)  $Cl_2$   
 d)  $CH_3Cl$
7. Choose the value of the Rydberg constant among the following value:  
 a)  $1.097 \times 10^7 m^{-1}$   
 b)  $1.602 \times 10^{19} C$   
 c)  $588 \times 10$   
 d)  $1.007 \times 10^{-11} m$
8. 4s orbital has:  
 a) One Node  
 b) Two node  
 c) Three node  
 d) 0 node
9. Electronic configuration of K is:  
 a)  $Ar 4s$   
 b)  $4s^1$   
 c)  $Ar 4s$   
 d)  $[He] 4s^1$
10. The spectrum of He is expected to be similar to that of:  
 a) H  
 b) Na  
 c) Li  
 d)  $Li^+$
11. Triatomic molecules have following movements:  
 a) Translational and vibrational  
 b) Rotational and vibrational  
 c) Translational and rotational  
 d) None of these
12. Law of mass action was derived by:  
 a) Guldberg  
 b) CM Guldbrug  
 c) Guldbrug and P. Wage  
 d) None
13. If we move down in electrochemical series:  
 a) Reduction potential will increase  
 b) Reduction potential will decrease  
 c) Oxidizing ability decrease  
 d) All of them
14. The periodic table consist of:

- NUMS and National MDCAT by Ali Sudais
- A) 7 horizontal series, 7 vertical series and 2 blocks  
 B) 8 horizontal series, 7 vertical series and 2 blocks  
 C) 7 horizontal series, 18 vertical series and 4 blocks  
 D) 8 horizontal series, 18 vertical series and 8 blocks
50. Variable valency is generally exhibited by:  
 A) Normal elements  
 B) Transition elements  
 C) Metallic elements  
 D) None of them
51. Which of the following oxides is amphoteric in character?  
 A)  $CaO$   
 B)  $CO_2$   
 C)  $SiO_2$   
 D)  $SnO_2$
52. Salt of weak basis reacts with strong acid to give  
 A) Basic solution  
 B) Acidic solution  
 C) Neutral solution  
 D) None
53. Is a technique to separate impurities from chemical products:  
 A) Lands Berger's method  
 B) Fractional crystallization  
 C) Beckmann method  
 D) None
54. A carbohydrate that cannot be hydrolyzed is called:  
 A) Monosaccharide's  
 B) Disaccharides  
 C) Polysaccharides  
 D) Oligosaccharides
55. One gram of carbohydrate yields energy:  
 A) 10kcal  
 B) 100kcal  
 C) 4kcal  
 D) 9kcal
56. Ascorbic acid is a chemical name of:  
 A) Vitamin D  
 B) Vitamin A  
 C) Vitamin C  
 D) Vitamin B6
57. The number of amino acids found in proteins that a human body can Synthesize is:  
 A) 230  
 B) 10  
 C) 5  
 D) 14
58. Choose the correct statement:  
 A) Ultraviolet radiation from sun causes a reaction that produces ozone  
 B) Ozone hole is depletion in total amount of  $O_3$   
 C) A single chlorine free radical can destroy 10000 ozone molecules  
 D) All of above
59. Which of the following is not an air pollutant?  
 A)  $N_2$   
 B)  $N_2O$   
 C)  $NO$   
 D)  $CO$
60. Pick up the correct statement about photochemical smog.  
 A) Photo chemical smog contains nitric oxide and un burnt hydrocarbon as main reactants  
 B) Photo chemical smog is caused by  $NO_2$



- C) Photochemical smog occurs in day time whereas the classical smog occurs in early morning hours  
D) All of these

## NUMS PHYSICS

- The physical quantity which produces angular acceleration in the body is  
A) Force B) Moment of inertia  
C) Impulse D) Torque
- The dimension of angular momentum is  
A)  $M L^2 T^{-1}$  B)  $M L T^{-1}$   
C)  $M^2 L T^{-1}$  D)  $M L T^{-1}$
- If  $A = B + C$  and A, B, C have scalar magnitudes of 5, 4, 3 unit respectively then the angle between vector A and Vector B is:  
A)  $\cos^{-1}(3/5)$  B)  $\cos^{-1}(4/5)$   
C)  $3.14/2$  D)  $\sin^{-1}(3/4)$
- The steering of a car has a radius 13 cm. The torque produced by a couple of 100 N is:  
A) 1300 Nm B) 2600 Nm  
C) 13 Nm D) 26 Nm
- A hollow sphere is filled with water and hung by a long thread. It is made to oscillate. If there is a small hole in the bottom through which water slowly flows out, the time period will  
A) Increase  
B) First increase then decrease  
C) Decrease  
D) Remain Unchanged
- A particle is projected from the ground with a kinetic energy E at an angle of 60 degree with the horizontal. Its kinetic energy at the highest point of its motion will be:  
A)  $E/\sqrt{2}$  B)  $E/2$   
C)  $E/4$  D)  $E/8$
- A bullet on penetrating 30cm into its target loses its velocity by 50%. What additional distance will it penetrate into the target before it comes to rest?  
A) 30cm B) 20cm  
C) 10cm D) 5cm
- When a spring is stretched by 10cm, the potential energy is stored is E. When the spring is stretched by 10cm more, the potential energy stored in the spring becomes.  
A) 2E B) 4E  
C) 6E D) 10E
- Average distance of the earth from the sun is  $L_1$ . If one year of the earth is D days, then one year of another planet whose average distance from the sun is  $L_2$  will be:  
A)  $D(L_2/L_1)^{1/2}$  days  
B)  $D(L_2/L_1)^{3/2}$  days  
C)  $D(L_2/L_1)20$  days  
D)  $D(L_2/L_1)$  days
- The point at which an applied force produces linear motion but no rotatory motion is:  
A) Mid-point B) Center of gravity  
C) Optical center D) Pole
- When a certain metal surface is illuminated with light of frequency  $\nu$ , the stopping potential for photoelectric current is  $V_0$ . When the same surface is illuminated with light of frequency  $\nu/4$ , the stopping potential is  $V_0/4$ . The threshold frequency for photoelectric emission is:  
A)  $V/6$  B)  $V/3$   
C)  $2V/3$  D)  $4V/3$
- Let L be the length and d be the diameter of cross section of a wire. Wires of the same material with different L and d are subjected to the same tension along the length of the wire. In which of the following cases the extension of wire will be the maximum?  
A) L=200cm, d=0.5mm  
B) L=300cm, d=1.0mm  
C) L=50cm, d=0.05mm  
D) L=100cm, d=0.2mm
- object placed in front of a concave mirror at a distance of X cm from the pole gives a 3 times magnified real image. If it is moved to distance of X+5cm, the 'magnification of the image becomes 2. The focal length of the mirror is:  
A) 15cm B) 20cm  
C) 25cm D) 30cm
- 22320 cal heat is supplied to 100g of ice at zero degrees centigrade. If the latent heat of fusion of ice is 80 cal/g and latent heat of vaporization of water is 540 cal/g the all amount of water thus obtained and its temperature respectively are:  
A) 8 g 100degree centigrade  
B) 100 g, 90degree centigrade  
C) 92.g 100 degree centigrade  
D) 82g, 100 degree centigrade
- For adiabatic process, the first law of thermodynamics is:  
A)  $W = \Delta U + Q$  B)  $Q = -W$   
C)  $Q = -W$  D)  $W = -\Delta U$
- A radioactive nuclide decays by emitting an  $\alpha$  particle and  $\gamma$ -ray photon, the change in its nucleon number will be:  
A) -4 B) -2  
C) 2 D) -3
- A magnetic needle is placed in a uniform magnetic field and is aligned with the SW. The needle is now rotated by an angle of 60 degree

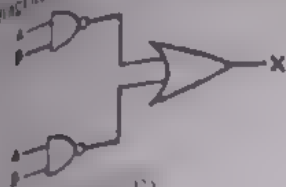
Ali Series

the work done is  $W$ , the torque on the magnetic needle at this position

B)  $3W$

D)  $(3/4)W$

Match the output Boolean expression of logic diagram shown in figure below?



$$A \cdot B + A \cdot B$$

$$A + B$$

$$A \cdot B$$

$$A + B$$

the amplitude of a particle executing SHM increases, its time period

A) Increase

B) Decrease

C) Increase or decrease

D) None of them

The RMS speed of the molecules of a gas at 100 degree centigrade is  $v$ . The temperature at which its RMS speed will be  $3v$  is:

A) 1000 degree centigrade

B) 900 degree centigrade

C) 800 degree centigrade

D) 700 degree centigrade

A frictional piston cylinder based enclosure contains some amount of gas at a pressure of  $10^5$  Pa. Then heat is pressure in a quasi-static process. The piston moves up slowly through a height of 10cm. If the piston has across section area of  $0.3\text{m}^2$ , the work done by the gas in the process is:

A) 6J

B) 12kJ

D) 24kJ

An electric cell of e.m.f  $E$  is connected across a wire of diameter  $d$  and length  $l$ . The drift velocity of electrons in the wire is  $v$ . If the length of the wire is changed to  $2l$ , the new drift velocity in the copper wire will be:

B)  $2v$

D)  $4v$

A charged particle is directed perpendicular in a magnetic field its trajectory

B) Helix

D) Circular

A ball is thrown vertically upward with a velocity of 98 m/s. If it takes 10 seconds to reach its highest point then the acceleration of the ball

25. The velocity of a car travelling on a straight road is 36 km/h at an instant of time. Now travelling with uniform acceleration for 10s, the velocity becomes exactly double. If the wheel radius of the car is 25cm then which of the following number is the closest to the number of revolutions that the wheel makes during this 10s?

A) 84

B) 95

C) 126

D) 135

26. Two glass prisms  $P_1$  and  $P_2$  are to be combined together to produce dispersion without deviation. The angle of the prisms  $P_1$  and  $P_2$  are selected as 40 and 30 respectively. If the refractive index of prism  $P_1$  is 1.54, then that of  $P_2$  will be:

A) 1.48

B) 1.58

C) 1.62

D) 1.72

27. A man throws a ball vertically upward in compartment of an accelerated train. Ball will fall

A) In front of him

B) In his hand

C) Behind him

D) beside him

28. Water is flowing in stream line motion through a horizontal tube. The pressure point in the tube is  $P$  where the velocity of flow is  $v$ . At another point, where pressure is  $P/2$ , the velocity of flow is [density of water =  $\rho$ ]

A) Double

B) Four times

C) Half

D) Same

29. A wire of initial length  $L$  and radius  $r$  is stretched by a length  $l$ . another wire of same material but with initial length  $2L$  and radius  $2r$  is stretched by length  $2l$ . the ratio of the stored elastic energy per unit volume in the first and second wire is:

A) 1:4

B) 1:2

C) 2:1

D) 1:1

30. A current of 1A is flowing along positive x-axis through a straight wire of length 0.5m placed in a region of magnetic field given by  $B = (2\hat{i} + 2\hat{j})$  T. The magnitude and the direction of the force experienced by the wire respectively are:

A)  $\sqrt{18}$  N along positive z-axis

B) 20 N, along positive x-axis

C) 2N, along positive axis

D) 4N, along positive axis

31. A bomber drops a bomb, when it is vertically above the target. It missed the target and because of:

A) Vertical component of the velocity of bomber

- B) Force of gravity  
C) Horizontal component of the velocity of bomber  
D) Acceleration of the bomber

## ENGLISH

- There was a surprising story in the paper about the car was stolen:  
A) Man, which his                      B) Man whose his  
C) Man, that his                      D) Man whose
- Several times during the session the director to tell his success story to the other promotion:  
A) Asked he                      B) Asked who  
C) Asked him                      D) Asked his
- When one need career counseling go to the college career advisor?  
A) You should                      B) It should  
C) He should                      D) One should cacti
- Did anybody do the work?  
A) Themselves                      B) Himself  
C) His self                      D) None
- Take your application to the you think can help you.  
A) Person whom                      B) Person  
C) Person who                      D) Person which

Read the passage and answer the questions given at the end of passage (5-10). Recent advances in science and technology have made it possible for geneticists to find out abnormalities in the unborn fetus and take remedial action to rectify some defects which would otherwise prove to be fatal to the child. Though genetic engineering is still at its infancy, scientists can now predict with greater accuracy a genetic disorder. It is not yet an exact science since they are not in a position to predict when exactly a genetic disorder will set in. While they have not yet been able to change the genetic order of the gene in germs, they are optimistic and are holding out that in the near future they might be successful in achieving this feat they have however, acquired the ability in manipulating tissue cells. However, genetic misinformation can sometimes be damaging for it may adversely affect people psychologically. Genetic information may lead to a tendency to brand some people as inferiors. Genetic information can therefore be abused and its application in deciding the sex of the fetus and its subsequent abortion is now hotly debated on ethical lines. But on this issue geneticist cannot be squarely blamed though this charge has often been leveled at them. It is mainly a societal

problem. At present genetic engineering is a process of detecting disorders but scientists hoped to reduce the costs when technology becomes more advanced. This is why progress in this area has been possible in scientifically advanced and rich country like the U.S.A, U.K and Japan. It remains to be seen in the future this science will lead to the development of a race of supermen or will be able to obliterate disease from this world.

- Which of the following is the same in meaning as the phrase "holding out" as used in passage?  
A) Catching                      B) Expounding  
C) Sustaining                      D) Restraining
- According to the passage the question of abortion is:  
A) Ignored                      B) Hotly debated  
C) Unanswered  
D) Left to the scientists to decide
- Which of the following is true regarding the reasons for progress in genetic engineering?  
A) It has become popular to abort female fetuses.  
B) Human beings are extremely interested in heredity.  
C) Economically sound and scientifically advanced countries can provide the infrastructure for such research.  
D) Poor countries desperately need genetic information.
- Which of the following is same in meaning as the word "obliterate" as used in passage?  
A) Wipe off                      B) Eradicate  
C) Give birth to                      D) Wipe out
- Which of the following is the opposite in meaning to the word "charged" as used in the passage?  
A) Calm                      B) Disturbed  
C) Discharged                      D) Settled
- Agenda: conference (analogy):  
A) Teacher class  
B) Agency assignment (analogy)  
C) Map: trip  
D) Man: women
- Manacle: male factor (analogy):  
A) Juvenile: delinquent                      B) Suave: Man  
C) Muzzle: dog                      D) Pinto: terrier
- Aerie: Eagle (analogy):  
A) Venom: rattle snake                      B) Viper: reptiles  
C) Hawk: falcon                      D) Lair: wolf
- Altimeter: height (analogy):  
A) Speedometer: speed  
B) Observatory: constellation



- C) 15  
D) 613
24. 2, 15, 41, 80  
A) 111  
B) 126  
C) 121  
D) 32
25. 8, 10, 14, 18, 34, 50, 60:  
A) 24  
B) 27  
C) 26  
D) 27
26. Sick is to Sack as Lack is to:  
A) Lack  
B) Lack  
C) Lat  
D) Meat  
E) Leck
27. What letter comes next in the following series?  
B D G K P  
A) C  
B) I  
C) B  
D) V
28. What number comes next in the following series? 34 24 16 10 6  
A) 5  
B) 10  
C) 3  
D) 2
29. If 4 is more than 9 write a as your answer otherwise write b?  
A) A  
B) B  
C) C  
D) D  
E) E
30. Children go to school because:  
A) They want to learn poems  
B) They want to gain knowledge  
C) They want to be away from home  
D) They want to tease the teacher  
E) They want to look beautiful

Ali Series

organization (analogy):

- B) A new recruit  
D) A wrestler

- B) Applaud  
D) Reject

- B) Bane  
D) Theorist

- B) Noble  
D) Lavish

- B) 16  
D) 24

- B) 216  
D) 360

- B) 325

**BIOLOGY**

1. C) Grass hopper
2. A) Haploid
3. A) Chloroplast
4. D) Piliomyces
5. B) RNA
6. D) Carpenter
7. C) Lodicule
8. C) Gene pool
9. D) All of the above
10. B) Blood clotting
11. D) Capitulum
12. A) Back cross
13. D) Sea fish
14. B) Blood clotting
15. A) water
16. D) Kangaroo
17. C) Cleft Palate
18. A) Adrenaline
19. C) Carboxyl group and amino group
20. B) Two chromosomes
21. D) Steroids
22. C) T-cell
23. B) Xerophytes
24. C) Monotremes
25. B) Spider
26. C) Budding
27. B) 3 ATP
28. D) Kline filters syndrome
29. A) AIDS
30. B) Less the rate of respiration
31. D) Paralyzes cilia
32. D) Carbon dioxide
33. B) Tricuspid value
34. B) Chromoplasts
35. C) B-lymphocytes
36. C) Wright 1968
37. A) Unidirectional
38. A) I<sub>2</sub> I<sub>2</sub>
39. B) Tryptophan
40. D) Both B and C
41. D) Galvani
42. B) Recombination during cell division
43. B) Jerks
44. B) 2112
45. C) Echinodermata
46. D) 100°F degree Fahrenheit
47. B) Squamous epithelium

48. C) Deoxyribose nucleic acid
49. A) Fatty liver
50. B) 4 to 5%
51. D) Physalis
52. B) Nematodes
53. E) None of these
54. D) None of these
55. B) Secondary
56. A) Induced ovulators
57. B) Primates
58. C) Epidermal and wet
59. D) None of these
60. C) Pectoral girdle
61. B) Endoderm
62. D) Fish
63. B) Reptiles and birds
64. D) All of these
65. B) Small intestine
66. A) Platyhelminthes
67. C) 7
68. A) 25cm
69. B) Cerebral cortex
70. B) Myopic
71. B) Gustatory receptors
72. C) Chondrogenesis
73. A) Pectoral
74. C) Inheritance of acquired characters
75. A) Darwinism
76. C) Small intestine
77. A) Pisces
78. A) Complete
79. C) Molluscs

**Chemistry**

1. A) NaCl, NaClO, H<sub>2</sub>O
2. A) NaCl
3. B) He
4. A) Spontaneous reaction
5. D) Ethylene glycol
6. C) Ortho hydrogen
7. A) Below 7
8. C) Be
9. B) CH<sub>3</sub>COOH
10. A) SF<sub>4</sub>
11. B) 25%
12. D) All of these
13. C) Fe<sub>4</sub>[Fe(CN)<sub>6</sub>] 3.H<sub>2</sub>O
14. C) Heat and work
15. C) Chemical method
16. B) 0.2 nm.

17. A) Quantity of fast moving electrons
18. B) C<sub>4</sub>H<sub>8</sub>
19. D) Element sodium is easily oxide
20. D) NaOH is named as caustic soda because it reacts with fatty form soap
21. C) Molten NaCl
22. D) High ionization energy
23. C) Magnesium and Barium
24. B) CO<sub>2</sub>
25. B) Pb<sub>3</sub>O<sub>4</sub>
26. A) Diamond
27. C) Silica or silicates
28. A) Diamond is the hardest; graphite is softer
29. C) Water
30. D) Metamers
31. B) Functional group
32. D) Tetrahedron
33. A) CH<sub>3</sub>CH<sub>2</sub>OH
34. C) Silver acetylide
35. C) They have high percentage of Carbon
36. D) All of true.
37. B) Carboxylic acid and alcohol
38. D) Benzophenone
39. C) O<sub>2</sub>
40. A) Decreases
41. C) CCl<sub>4</sub>
42. A)  $1.096.78 \times 10^3 \text{ m}^{-1}$
43. C) Three. node
44. A) [Ar] 4s<sup>1</sup>
45. A) Li<sup>+</sup>
46. B) Vibrational and rotational
47. B) CM goldbug and P wage
48. A) Reduction potential will increase
49. B) 7 horizontal series 18 vertical series and 4 blocks
50. B) Transition elements
51. D) SnO<sub>2</sub>
52. B) Acidic solutions
53. B) Fractional crystallization
54. A) Monosaccharide's
55. C) 4kcal
56. C) Vitamin C
57. B) 10
58. C) A single chlorine free radical can destroy 10000 ozone molecules
59. A) N<sub>2</sub>

10. D) All of these

Physics

1. D) Torque
2. D)  $m^2 L^1 T^{-2}$
3. D)  $\text{Sin}^{-1}(3/4)$
4. D) 26 Nm
5. B) First increase then decrease
6. C) E 4
7. A) 30cm
8. A) 2E
9. A)  $D \propto L^2 \propto L^2 \text{ days}$
10. A) Mid-point
11. A) V 6
12. B)  $L = 3000\text{cm}$ ,  $d = 1.0\text{mm}$
13. A) 15cm
14. C) 92g 100 degree centigrade
15. D)  $W = \Delta U$
16. A) 4
17. A)  $2\sqrt{3}W$
18. D)  $X = \overline{AB} + \overline{AB}$
19. D) Remains Constant
20. A) 546 degree centigrade

21. B) 12kJ
22. B) 2V
23. D) 604Nm
24. D) 98ms<sup>2</sup>
25. C) 126
26. C) 1.62
27. B) In his hand
28. B)  $(V_2 - p/)$
29. B) 1:2
30. C) 2N along positive axis
31. A) Vertical component of the velocity of bomber

ENGLISH

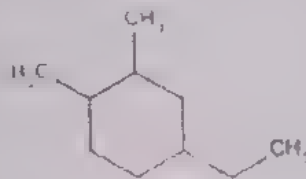
1. D) Man whose
2. C) Asked him
3. C) He should
4. B) Himself
5. A) Person whom
6. C) Sustaining
7. D) Left to the scientists to decide
8. B) Human beings are extremely interested in heredity
9. B) Eradicate
10. C) Discharged

11. B) Agency assignment
12. B) Suave; Maniac
13. C) Hawk falcon
14. C) Racetrack furlong
15. C) Prodigal generosity
16. B) A new recruit
17. B) outlet for strong emotions
18. D) Reject
19. C) Believer
20. C) Selfish
21. A) 14
22. D) 360
23. A) 312
24. C) 121
25. A) 24
26. A) Lack
27. D) V
28. D) 2
29. A) A
30. B) They want to gain knowledge




- Which of the following is necessary for the normal development of leaves and bark of the plants?
  - Sodium
  - Aluminum
  - Calcium
  - Beryllium
- Which of the following fertilizer has maximum percentage of nitrogen in solid state?
  - Ammonia
  - Urea
  - Di ammonium hydrogen phosphate
  - Ammonium nitrate
- Which of the following is called animal starch?
  - Amylose
  - Cellulose
  - Glycogen
  - Glycine
- Enzymes are ..... that catalyze chemical living organisms and are very specific in their action.
  - Proteins
  - Vitamins
  - Lipids
  - Minerals
- $\text{HCOOH}$  is the structure of
  - Acetic acid
  - Formic acid
  - Valeric acid
  - Caproic acid
- High level of ..... and ..... in the blood and the contributing factors in the formation of kidney stones.
  - Calcium, oxalate
  - Calcium, magnesium
  - Calcium, sodium
  - Sodium, sulphate
- Limbic system refers to a ring of forebrain structures and portion of each of the following EXCEPT:
  - Cerebral cortex
  - Cerebellum
  - Basal ganglia
  - Hypothalamus
- Which of the following does not belong to f block elements
  - Uranium
  - Samarium
  - Thorium
  - Osmium
- The type of gene interaction in which the effect cause by a gene at one focus interfere with the effect caused by another gene at another locus is known as:
  - Pleiotropy
  - Epistasis
  - Polygenic inheritance
  - Gene linkage
  - Crossing over
- Which of the following figure represents analogous feature:
  - Elephant trunk and human incisors
  - Teleost erythrocyte and mammalian erythrocyte
  - Insect wing and bat wing
  - Mole forelimb and bird wing

- Reptilian heart and mammalian heart
- The position of an organism in a food chain of an ecosystem is called:
  - Level of ecosystem
  - Food chain
  - Food web
  - Trophic level
  - Energy pyramid
- Which of the following trophic levels has large bio-mass ecosystem?
  - Decomposers
  - Primary consumers
  - Secondary consumer
  - Producers
  - Herbivores
- The zone with insufficient light to support photosynthesis ecosystem is called:
  - Oceanic sub-zone
  - Littoral zone
  - Profound zone
  - Littoral benthic zone
- Gasoline is a mixture of hexane and
  - Methane
  - Butane
  - Heptane
  - Aromatic hydrocarbons
- What is the name of following compound?

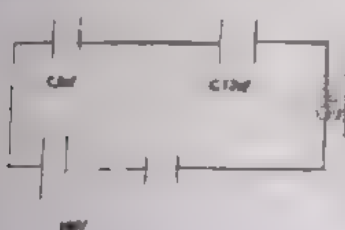


- 1-Ethyl-3, 4-dimethylcycloheptane
  - 2-Ethyl-4, 5-dimethylcyclohexane
  - 1-Ethyl-3, 4-dimethylcyclohexane
  - 4-Ethyl-1, 2-dimethylcyclohexane
- Cyanohydrins can be synthesized from ketones through:
    - Nucleophilic addition reaction
    - Unimolecular Nucleophilic substitution reaction
    - Electrophilic substitution reaction
    - Bimolecular Nucleophilic substitution reaction
    - Nucleophilic elimination reaction
  - By fermentation process of starch and by the catalytic addition of enzyme ..... is produced
    - Methyl alcohol
    - Ethyl alcohol
    - Acetyl alcohol
    - Methanol
  - Process of uncontrolled cell division is called cancer, which one of the following reasons?
    - Excessive cell division
    - Excessive cell death
    - Excessive cell growth
    - Excessive cell differentiation

1. DNA replication  
Translation
2. Which of the following is derived from Latin word VENT ME which means poisonous?  
A) Bacteria  
B) Fungi  
C) Virus  
D) Malaria
3. Functions of the brainstem include all of the following EXCEPT?  
A) Integration of fighting reflexes  
B) Autonomic control for respiration  
C) Equilibrium and posture regulating  
D) Initiation of voluntary movements  
E) Fixation of the eyes
4. Cardiac output is increased by all of the following EXCEPT:  
A) Hypoxia  
B) Exercise  
C) SNA  
D) Pregnancy  
E) Anemia
5. An enzyme that helps in the conversion of RNA to DNA is called:  
A) Transcriptase  
B) Polymerase  
C) Reverse transcription  
D) Synthetase
6. Sequence of stop codon in DNA is:  
A) TAG  
B) AUG  
C) UAG  
D) AAA  
E) AGT
7. The fungal cell wall contains:  
A) Peptidoglycan  
B) Chitin  
C) Suberin  
D) Cutin  
E) Proteins
8. DNA synthesis takes place in:  
A) G<sub>0</sub>  
B) G<sub>1</sub>  
C) G<sub>2</sub>  
D) S
9. The RNA found in Ribosomes is:  
A) m RNA  
B) r RNA  
C) t RNA  
D) Polysome  
E) genes
10. The outermost boundary in most of the leaf cell is:  
A) Cell wall  
B) Cell membrane  
C) Tonoplast  
D) Unit membrane  
E) Nuclear substances
11. In human, cell \_\_\_\_\_ is responsible for producing hydrogen peroxide.  
A) Lysosomes  
B) Mitochondria  
C) Peroxisomes  
D) glyoxisomes
12. The soluble part of blood is called:  
A) Karyotymph  
B) Nucleoplasm  
C) Protoplasm  
D) Serum
13. Neurons CANNOT undergo division, because they do not have:  
A) P.A.R.C

- A) Centrosome  
B) Nucleus  
C) Mitochondria  
D) Golgi apparatus
31. Hypothalamus initiates the release of Hormones occurs by:  
A) FSH  
B) Oxytocin  
C) ACTH  
D) LH  
E) GH
32. Transport of glucose across the cell membrane occurs by:  
A) Simple diffusion  
B) Facilitated diffusion  
C) Osmosis  
D) Primary active transport  
E) Secondary active transport
33. Which artery supplies blood to the liver?  
A) Pulmonary artery  
B) Hepatic artery  
C) Celiac artery  
D) Thoracic artery
34. Movement of the Hip joint is which type of synovial joints?  
A) Gliding joint  
B) Ball and socket joint  
C) pivot joint  
D) Hinge joint
35. A hormone called \_\_\_\_\_ controls the secretion of gastric juice.  
A) Gastrin  
B) Secretin  
C) Thyroxin  
D) Iodothyroxine  
E) Parathormone
36. The below given diagrams shows stages of mitosis, what is the order of these stages during mitosis?
- 
- A) 1 2 4 3 5  
B) 2 3 5 1 4  
C) 3 5 4 1 2  
D) 3 4 5 1 2
37. Most bacteria require vitamins for which of the purpose?  
A) Source of energy  
B) Growth factor  
C) Source of carbon  
D) Source of electron donors
38. Germ theory of disease was proposed by:  
A) Leeuwenhoek  
B) Louis Pasteur  
C) Walther Fleming  
D) Robert Koch  
E) Edward Jenner
39. Freeing of an object from all living organism bacteria and their spores, fungi and their spores:  
A) Sterilization  
B) Disinfection  
C) Decontamination  
D) Immunization

1. The animals that feed on organic debris from decomposing plants and animals are called:
- A) Carnivores  
B) Detritivores  
C) Omnivores  
D) Spongocoel
2. Actinia is biological name of:
- A) Sea Anemone  
B) Corals  
C) Jellyfish  
D) Spongocoel
3. The simplest form in Kingdom animalia belongs to:
- A) Protozoa  
B) Bilateria  
C) Protostomia  
D) Parazoa
4. The perifers are pore-bearing animals, commonly called:
- A) Corals  
B) Sponges  
C) Hydras  
D) Anemones
5. Two capacitors  $C_1(6\mu f)$  and  $C_2(12\mu f)$  are in --- 180volts D.C supply. Calculate the charge on  $C_1$  and  $C_2$ .



- A)  $120 \times 10^{-6} C, 420 \times 10^{-12} C$   
B)  $320 \times 10^{-6} C, 420 \times 10^{-12} C$   
C)  $420 \times 10^{-6} C, 220 \times 10^{-12} C$   
D)  $720 \times 10^{-6} C, 220 \times 10^{-12} C$   
E)  $820 \times 10^{-6} C, 420 \times 10^{-12} C$

Capacitor block DC and allow AC, the question is present in D.C.

6. Three resistors of a

- B) 0.4  
D) 1.5

7. During the process of

- B) One unit; No unit  
D) No unit; No unit

8. If an ideal gas has volume  $V$  at  $27^\circ$  and is heated at constant pressure so that its volume becomes  $1.5V$ , then the value of final temperature is

- B) 373K  
D)  $600^\circ C$

68. An electron is moving along the axis of a solenoid carrying a current, which of the following is a correct statement about the electromagnetic force acting on the electron?

- A) The force acts radially inwards  
B) The force acts radially outwards  
C) The force acts in the direction of motion  
D) No force acts

69. The magnetic lines of force are directed in a manner that that:

- A) Originated at South Pole and terminated at North Pole  
B) Pass through the magnet  
C) Originated at North Pole and terminated at South Pole  
D) Go away from both the poles

70. What happens to the pressure of a sample of helium gas if the temperature is increased from  $200K$  to  $900K$ , with no change in volume?

- A) Pressure increases by a factor of 4  
B) Pressure decreases by a factor of 4  
C) Pressure decreases by a factor of 2  
D) Pressure increases by a factor of 2  
E) No change in pressure

71. The magnetic field is produce in a solenoid depends on:

- A) its strength  
B) Its strength and current in it  
C) Its strength and number of turns in it  
D) The numbers of turns and current in it

72. Equation of continuity is expressed as:

- A)  $A_1 V_2 = A_2 V_1$   
B)  $A_1 V_1 = A_2 V_2$   
C)  $A_1 H_2 = A_2 H_1$   
D)  $A_1 H_1 = A_2 H_2$

73. The path difference for the constructive interference is:

- A)  $(n-1)\lambda$   
B)  $(n+1)\lambda$   
C)  $n\lambda/2$   
D)  $2n\lambda$   
E)  $n\lambda$

74. The light exhibits the phenomena of constructive interference under the situation when it is \_\_\_ and \_\_\_.

- A) Monochromatic and in phase  
B) Monochromatic and out of phase  
C) In phase and non-monochromatic  
D) Out of phase and non-monochromatic

75. The distance between two consecutive antinodes is equal to:

- A)  $\lambda/8$   
B)  $\lambda/\sigma$   
C)  $\lambda/4$   
D)  $\lambda/2$



76. The charge on neutron is

- A)  $+1.6 \times 10^{-19}$  C  
B)  $-1.6 \times 10^{-19}$  C  
C)  $+1.6 \times 10^{-18}$  C  
D)  $-1.6 \times 10^{-18}$  C

77. Which of the following is density independent quantity?

- A) Mass  
B) Volume  
C) Density  
D) Temperature

78. Alpha rays are also called cathode rays. They are in fact same as \_\_\_\_\_ rays.

- A) Helium  
B) Deuterium  
C) Hydrogen  
D) Helium

E) Lithium

79. When two bodies move toward each other with constant speed the distance between them decrease at the rate of  $6\text{m/sec}$ . If they move in the same direction, the distance between them increase at the rate of  $4\text{m/sec}$ . calculate their velocities?

- A)  $5\text{m/sec}$ ,  $1\text{m/sec}$   
B)  $3\text{m/sec}$ ,  $1\text{m/sec}$   
C)  $6\text{m/sec}$ ,  $1\text{m/sec}$   
D)  $4\text{m/sec}$ ,  $2\text{m/sec}$

80. When an applied stress changes the volume, the change in volume per unit volume is known as:

- A) Polymetric strain  
B) Crystalline strain  
C) Volumetric strain  
D) Equal strain

81. When fluid is incompressible, it means:

- A) No internal frictional force  
B) Independent of coordinates  
C) Independent of time  
D) Its density remains constant  
E) Its density remains variable

82. In medical diagnosis for precise internal imaging of brain \_\_\_\_\_ radiographs are used)

- A) X-ray  
B) Beta ray  
C) Gamma ray  
D) Alpha ray

83. A steady current of  $5\text{ A}$  is drawn from an electric source at a voltage of  $100\text{ V}$ . the power consumed (watts) is

- A)  $0.05$   
B)  $5$   
C)  $500$   
D)  $5000\text{W}$

84. The SI unit of rate of flow of a fluid -

- A)  $\text{Meter}^3/\text{sec}$   
B)  $\text{Meter}^2/\text{sec}$   
C)  $\text{Meter}^2/\text{sec}$   
D)  $\text{Meter}^3/\text{sec}^2$

85. The level of radiation to which human body can be exposed \_\_\_\_\_ the radiation from natural source:

- A)  $1$  to  $10$   
B)  $10$  to  $100$   
C)  $10$  to  $1000$   
D)  $10$  to  $10000$

86. The process by which various component of cells including its organelle can be isolated is called

- A) Homogenization  
B) Cell fractionation  
C) Cell Fixation

prec. 1. Electrophoresis

2. Centrifugation

87. Which of the following shows structure which is found in a eukaryotic cell?

(Yes = present, No = absent)

	Nucleus	mitochondria	Ribosome
A	No	No	No
B	No	Yes	No
C	Yes	No	No
D	Yes	No	Yes
E	Yes	Yes	Yes

88. Which of the following term is used to describe membrane of central vacuole?

- A) Tonoplast  
B) Myoplast  
C) Periplast  
D) Epitoplast

89. The major portion of  $(\text{NH}_4)_2\text{CO}_3$  is secreted by:

- A) Sweat  
B) Saliva  
C) Urine  
D) Stool

90. In white blood cell monocytes have a short life period of ..... Hours.

- A)  $10-20$   
B)  $21-30$   
C)  $31-35$   
D)  $36-40$

91. The animals that feed on organic

- A) Herbivores  
B) Carnivores  
C) Omnivores  
D) Detritivores

92. Pinacocytes forms:

- A) Pores  
B) Ostia  
C) Epidermis  
D) Spongocytes

93. Actinia is the biological name of:

- A) Sea anemones  
B) Corals  
C) Octopus  
D) Jelly fish  
E) Frog

94. The simplest form in kingdom Animalia belong to:

- A) Eumetazoa  
B) Bilateria  
C) Protozoa  
D) Parazoa  
E) Protostomia

95. The porifera are -

- A) Corals  
B) Sponges  
C) Hydra  
D) Anemones

96. As the concentration of reactant increase, the rate of reaction also increase, it is because:

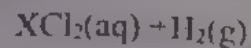
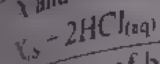
- A) K.E increase in molecules  
B) Oscillation increase between molecules  
C) Collision frequency increase  
D) Temperature of molecules increases

97. The equation shows the reaction between element X and \_\_\_\_\_ dissolve Hydrochloric acid.

What types of bonding are present in element

NMDCAT in my Pocket (Our YouTube Channel)

X and in compound  $\text{XCl}_2$ ?



Types of bonding	
In	In compound $\text{XCl}_2$
element X	
Covalent	Covalent
Covalent	Ionic
Metallic	Covalent
Metallic	Ionic

98. If the value of  $K_c$  is very large then it shows that \_\_\_\_\_ completed.

- A) Forward reaction      B) Reverse reaction  
C) Equilibrium is maintained  
D)  $K_c$  is moderate

99. For stable molecular geometry, each of carbon atom undergoes:

- A)  $sp$  hybridization      B)  $sp^2$  hybridization  
C)  $sp^3$  hybridization      D)  $dsp^3$  hybridization  
E)  $d^2sp^3$  hybridization

100. On hydrogen atom spectrum, series of spectral line emission within visible region, ie

# NUMS and National MDCAT by Ali Sudais

- A) Lyman series      B) Balmer series  
C) Paschen series      D) Bracket series  
E) Pfund series

101.  $s-sp^3$  overlap occurs in all except:

- A)  $\text{CH}_4$       B)  $\text{CH}_3$   
C)  $\text{HF}$       D)  $\text{HI}$

102.  $\Delta H - \Delta E + P\Delta V$  is the change in enthalpy at constant:

- A) Volume      B) Pressure  
C) Temperature      D) Mass

103. Alkyl halides can also be obtained by halogenation of:

- A) Alcohol      B) Alkenes  
C) Alkanes      D) Ketones

104. The oxidation of  $\text{CHCH}$  shows the formation of final product:

- A) Acetic acid      B) Picric acid  
C) Oxalic acid      D) Formic acid

105. In composition of natural gas 0.17% is constituted by:

- A) Methane      B) Ethane  
C) Butane      D) Nitrogen

## KFY &amp; HINTS

- |  |                           |                  |
|--|---------------------------|------------------|
| 1. C   | 34. B                     | 70. ..           |
| 2. A   | 35. A                     | 71. ..           |
| 3. C   | 36. D                     | 72. ..           |
| 4. A   | 37. B                     | 73. .            |
| 5. B   | 38. D                     | 74. ..           |
| 6. B   | 39. A                     | 75. ..           |
| 7. C   | 40. A                     | 76. ..           |
| 8. D   | 41. B                     | 77. ..           |
| 9. A   | 42. C                     | 78.              |
| 10. C  | 43. D                     | 79. ..           |
| 11. D  | 44. C (Dark red actually) | 80. ..           |
| 12. D  | 45. C                     | 81. .            |
| 13. D  | 46. B                     | 82. .            |
| 14. D  | 47. C                     | 83.              |
| 15. D  | 48.                       | 84. .            |
| 16. A <b>Hint:</b> triple bond is present in the CN, therefore, addition reaction is possible only | 49. B                     | 85.              |
| 17. B  | 50. C                     | 86. E            |
| 18. A  | 51. B                     | 87. A            |
| 19. C  | 52. B                     | 88. C            |
| 20. F  | 53.                       | 89. B            |
| 21. C  | 54. D                     | 90. D            |
| 22. C  | 55. B                     | 91. C            |
| 23. C  | 56. C                     | 92. A            |
| 24. B  | 57. A                     | 93. A            |
| 25. D  | 58. D                     | 94. B            |
| 26. B  | 59. C                     | 95. B            |
| 27. A  | 60. A                     | 96. C            |
| 28. C  | 61. A                     | 97. D            |
| 29. D  | 62. B                     | 98. A            |
| 30. A  | 63.                       | 99. C            |
| 31. D  | 64.                       | 100. B           |
| 32. B  | 65. .                     | 101. A           |
| 33. B  | 66.                       | 102. B           |
|  | 67.                       | 103. B           |
|  | 68.                       | 104. Acetic Acid |
|  | 69.                       | 105. D           |



English Vocabulary: PMC/NMDCAT WORDLIST

SYNONYMS AND ANTONYMS

Words	Synonyms	Antonyms
<p><b>APPALLING</b> خوہاک دھچکا لگنا خوف زدہ ہونا</p> <p>Meaning: Shocking Extremely bad Or very bad Or difficult</p> <p>Hinnak Shadid tawar per qabile nafra:</p>	<ul style="list-style-type: none"> <li>• Horrific</li> <li>• Horrifying</li> <li>• Horrible</li> <li>• Terrible</li> <li>• Awful</li> <li>• Dreadful</li> <li>• Ghastly</li> <li>• Hideous</li> <li>• Horrendous</li> <li>• Frightful</li> <li>• Atrocious</li> <li>• Abominable</li> <li>• Abhorrent</li> <li>• Outrageous</li> <li>• Hateful</li> <li>• Loathsome</li> </ul> <p>(قابل نفرت)</p> <ul style="list-style-type: none"> <li>• Odious</li> <li>• Gruesome</li> </ul> <p>(الرزہ خیز)</p> <ul style="list-style-type: none"> <li>• Monstrous</li> <li>• Nightmarish</li> <li>• Heinous</li> </ul> <p>(گھناؤنی)</p> <ul style="list-style-type: none"> <li>• harrowing</li> <li>• dire</li> <li>• vile</li> <li>• deplorable</li> <li>• vulgar</li> </ul> <p>In Sentence: (Shocking/extremely bad) They were living in appalling conditions in the prison.</p> <ul style="list-style-type: none"> <li>• (Very bad):</li> </ul>	<ul style="list-style-type: none"> <li>• Beautiful</li> <li>• Calming</li> <li>• Comforting</li> <li>• encouraging</li> <li>• savory</li> <li>• reassuring</li> <li>• beggarly</li> <li>• wholesome</li> <li>• innocuous</li> <li>• luscious</li> <li>• Delightful</li> <li>• Commonplace</li> <li>• Unalarming</li> </ul>
<p><b>ASTOUNDED</b> حیرت زدہ</p> <p>Meaning: Very surprised or shocked by something, because it seems very unlikely</p>	<ul style="list-style-type: none"> <li>• Astonished</li> <li>• surprised</li> <li>• Dazed (Confused, Shocked – dang kar daina)</li> <li>• amazed</li> <li>• bewildered (confused)</li> <li>• Baffled (amazed, confuse someone – His behavior baffles me)</li> </ul>	<ul style="list-style-type: none"> <li>• Calm</li> <li>• Clarify</li> <li>• Clear up</li> <li>• Enlighten</li> <li>• Expect</li> <li>• Explain</li> <li>• Bore</li> <li>• Dull</li> </ul>

<b>BRISKLY</b> Tazay Phertay Bastay	minutely, rapidly, vigorously, briskly, promptly	listlessly, slowly, sluggishly
<b>BLAD (N.V)</b> Munida <b>BRIMMING</b> To fill something Bharpoor, carshar, lab ralz, lubalab	Drip, drop, glob, burk, bloo, chalplet, globule, spherule, sphere, oval, ovoid, furnish, adorn packed, verto, tad, burshap, teeming, overfilled, abounding, fraught, teeming, swarming	antidiv, chaotic unto, smooth, spread, flatten, unfold empty, unfilled deficient, incomplete, bare, vacant, stark, void, devoid, exhausted, shy, shortish
<b>BAFFLING</b> confused Hizay, in Hairat Jdo	thwart, frustrate, foil, balk, check, block, hinder, obstruct, bar, prevent, deflect, bewildering, confounding.	clear comprehensible,athomable
<b>BASHFUL</b> Shambhushaat Sharminda, Sharminda, Sharmisar	shy, reserved, diffident, retiring, self-conscious, coy, demure, reticent, reluctant, shrinking	aggressive, bold, forward, confident, unabashed, unshy
<b>BECKONED</b> Soo, tapar, ishara Gama, Ishara say	entice, invite, tempt, coax, lure, charm, attract, draw, motioned, gestured, wave	repel, repulse, turn off, deter, push, reply
<b>COVETED</b>	desirable, desired, in demand(p), sought after	dislike, hate, abjure, be generous, give, not want
<b>CREDENTIALS (N.V)</b>	certificates, diplomas, documents approve, allow, vet	disapproval, refusal
<b>CAPACIOUS</b>	roomy, commodious, spacious, ample, big, large, sizeable, generous	cramped, small, squeezed, tiny
<b>COLLIDED WITH</b>	clash, differ, diverge, disagree	aid, assist, halt, help, let go, lose, retreat, stop, surrender, tap
<b>CONFRONT</b>	face, beset, harass, worry, oppress, annoy, vex, irritate, exasperate, strain, stress	avoid, dodge, evade, surrender, yield, back down
<b>COMPELLED</b>	pressure, impel, drive, press, push, urge	dissuade, discourage, halt, leave alone, stop, block
<b>CREDULY</b> <b>COAXED</b>	artlessly, inexpertly persuade, wheedle, cajole, beguile, flatter, seduce, lure, entice, tempt, inveigle, woo, man oeuvre	discourage, repel, repulse, turn off, disenchant, disgust
<b>COMPREHENSION</b>	grasp, grip, conception, apprehension, cognition, cognizance, ken, knowledge	ignorance, inability, incomprehension, misinterpretation, mistake, misunderstanding

27	CURIOUS	awareness, perception, discernment, extraordinary, remarkable, puzzling, mystifying, mysterious, perplexing, baffling, unaccountable	incurious, unconcerned, average, disinterested, indifferent, normal, ordinary, uninterested
28	CASUALLY	by chance, inadvertently, unintentionally, informally	cautiously, attentively, meticulously
29	CONFINING	<ul style="list-style-type: none"> <li>• Enclave</li> <li>• Incarcerate</li> <li>• Imprison</li> <li>• Intern</li> <li>• Impound</li> </ul>	<ul style="list-style-type: none"> <li>• Delimiting</li> <li>• Freeing</li> <li>• liberating releasing</li> </ul>
30	CRAMMED	stuff, pack, jam, fill, crowd, throng, overfill, tout, crush	abstain, diet, fast, let go, nibble, surrender, uncompressed
31	CONFIRM	affirm, corroborate, reassert, substantiate, support, sustain	confuse, contradict, deny, disallow, disapprove, discredit, disprove, invalidate, refuse, reject, disagree
32	CAUTIONED	advise, warn, recommend, counsel, urge, admonish, exhort	abruptness, hastiness, impetuosity, precipitousness, rashness, suddenness, inconsiderateness, inconsideration, thoughtlessness
33	CAPTIVATED	enthral, charm, enchant, bewitch, fascinate, beguile, entrance, enrapture, delight, attract, allure, lure	annoy, bore, depress, disappoint, disenchant, disgust, displease, disturb, forget, offend, pain, refuse
34	CONDESCENDED	patronize, treat condescendingly, speak condescendingly to, speak haughtily to, talk down to, look down one's nose at, look down on, put down, be snobbish to, design, stoop	contradict, decline, deny, disagree, disallow, disapprove, disobey, dispute
35	COMPELLED	pressure, impel, drive, press, push, urge	dissuade, discourage, halt, leave alone, block, check, delay, deter
36	CRITERIA	standard, norm, yardstick, benchmark, touch stone, test, formula, measure, gauge, scale, barometer, indicator, litmus test	change, conjecture, fancy, guess, possibility, probability
37	DAINTILY	exquisitely, daintily, neatly	difficultly, roughly, un-carefully, awkwardly
38	DISPUTE	debate, discussion, discourse, disputation, argument, controversy, contention, disagreement, altercation, falling-out	accord, agreement, calm, concord, concurrence, harmony, peace, quiet
39	DISTRACT	disturbing, unsettling, intrusive, disconcerting, bothersome, confusing	anger, bore, calm, clarify, clear up, comfort, explain, tire, upset, help, soothe
40	DRUMMED	tap, beat, rap, knock, strike, thud, thump	happy, soothe
41	DILAPIDATED	tumbledown, ramshackle, broken-down, shabby, battered, rickety, shaky, unsound, crumbling	ok, good, healthy, neat, nice, repaired, sound, stable, in good repair
42	DISCONSOLATELY	desolately	confidently, expectantly, hopefully



43 DELICATELY	exquisitely, fine, finely	indelicately, strongly, uncarefully
44 DANK	damp, musty, chilly, clammy, wet, moist, unaired, moisture-laden, humid	arid, dry, parched
45 DILAPIDATED	shabby, battered, rickety, shaky, unsound, crumbling, ruined, decayed, decaying, worn out	sound, stable, ok, repaired
46 DISGUISE	camouflage, concealment, outfit, costume	back, character, honesty, personality, reality, rear
47 DEFINITE	certain, sure, positive, absolute, conclusive, decisive, firm, concrete, final, unambiguous, unequivocal	ambiguous, doubtful, equivocal, fuzzy, indefinite, indistinct, inexact, obscure, questionable, uncertain, unclear, unsure
48 DISPENSING	wave, omit, drop, leave out, forgo, give up, relinquish	conceal, hide, hoard, hold, keep, retain, secret, attach
49 ENCHANTED	delighted, fascinated, enraptured, entranced	repel, bore
50 ENCOURAGED	stimulate, animate, invigorate, vitalize, revitalize, embolden, fortify, rally, incite	discouraged, disheartened, dispirited
51 ENDE	display, show, exhibit, manifest, demonstrate, transmit, breathe, embody	conceal, deny, fill, hide, hold, keep, load, refuse
52 ECCENTRIC	acentric, bizarre, case, character, eccentric, person, flaky, freakish, freaky, geek, nonconcentric, oddball, off-center, off-centered, outlandish, outré, type, unconventional	common, conventional, familiar, normal, ordinary, reasonable
53 EXCURSION	outing, expedition, jaunt, junket, cruise, pleasure trip, sashay	stay,
54 ELABORATE	careful, complicate, detailed, dilate, elaborated, enlarge, expand, expatiate, exposit, expound, fancy, flesh out, lucubrate, luxuriant, rarify, refine, work out	easy, facile, natural, simple, uncultured, unrefined, unsophisticated, general, normal
55 EXASPERATION	irritation, annoyance, chagrin, vexation, anger, fury, rage, wrath, spleen	calm, cheer, delight, enjoyment, happiness, joy, peace, pleasure, calming
56 EXPANSIVE	cavernous, communicative, communicatory, distensible, erectile, euphoric, expandable, expandable, expansible, grand, happy, impress, We, inflatable, talkative	narrow, limited, quiet, reserved, silent
57 EXAGGERATION	hyperbole, magnification, overstatement	truth, compression, decrease, essence, shrinkage, minimization
58 EVALUATES	judge, gauge, rate, estimate, appraise	neglect
59 FATALITY	death, casualty, mortality, victim, loss	birth
60 FICKLED	swish, twitch, wave, wag, waggle, shake, whip, twirl, swing, brandish	float, hang, hover
61 FLAWLESSLY	spotlessly, immaculately, perfectly, impeccably, soundly, purely	amiss, badly, defectively, faultily, unperfectly, wrongly
62 FRICTION	clash, detraction, rubbing, rubbing	agreement, harmony, peace

be still, steady, calm, remain, gentle

63 FLUTTERED

beat, quiver, agitate, vibrate, twitch,  
shake, wag, waggle, swing, oscillate,  
thrill, thrash, flail

careless, rash, rough, incautious

64 GINGERLY

cautiously, carefully, delicately,  
warily, chatily, guardedly,  
circumspectly, prudently, judiciously,  
on one's guard, on the alert

dark, dull, gloomy, rough, coarse

65 GLISTENING

bright, glossy, lustrous, sheeny, shining,  
shiny

center, core, heart

66 FRINGED

frontier, boundary, partition, borderline,  
dividing line

inner, inside, interior, middle

67 GLARED

stare angrily, scowl, glower, look  
daggers, frown, give someone a black  
look

grin, smile, aid, assist, help

68 GROGGY

luddled, muddled, confused,  
bewildered, disoriented, disorientated,  
vague, benumbed, numb, stunned,  
dizzy, punch-  
drunk, shaky, staggeringclear, stable, steady, unshaky, clear,  
headed, copizant

69 HEAP

pile, stack, mass, mound, mountain,  
quantity, load, lot, bundle, jumble

debt, ditch, individual, lack, little

70 HIDEOUS

horrid, horrific, offensive, outrageous,  
repulsive, ugly

one, part, valley, want, bit

71 HABITAT

Natural environment,  
Natural element, natural  
territory, natural  
surroundings, natural  
terrain, home, domain, haunt

agreeable, attractive, beautiful

common, delightful, friendly, gentle,  
great happy

unnatural surroundings

72 HAGGARD

bony, cadaverous, careworn,  
drawn, emaciated, gaunt,  
lean, pinched, raddled,  
skeletal, thin, tired, wasted,  
worncolorful, fat, plump, thick, fresh, healthy,  
hearty, strong

73 HAPHAZARDLY

arbitrarily, at random, every which  
way, haphazard,  
indiscriminately, randomly,  
willy-nilly

methodically, systematically

74 HARMONY

concord, concordance,  
harmoniousness, musical harmonydisagreement, discord, dislike, hatred,  
incompatibility, cacophony, clash

75 HAUGHTY

distantful, lordly, prideful, proud, snooty,  
superbious, swappering

disproportion fighting

humble, shy, meek, timid

76 HEARSAY

indirect rumor, rumour

quiet, silence, evidence, proof, reality,  
testimony

77 HAVOC

devastation, destruction, damage,  
desolation, depredation, despoliation,  
annihilation, man, disasterblessing, boon, building, calm, creature,  
good, fortune, good luck

79	INTENDED	considered, studied, knowing, willful, wanton, purposeful, purposive	unfixed
80	INAIN	worthless, nugatory, ineffective, ineffectual, inefficacious, impotent, powerless, unavailing	deadly, effective, effectual, efficacious, efficient, fruitful, potent, productive, profitable, successful, virtuous
81	ILLUMINATION	light, lighting, radiance, gleam, glimmer, brilliance, glow, glare, dazzle, flash	dimness, darkness, dimness, ignorance
82	INVARIABLY	regularly, consistently, repeatedly, habitually, unfailingly	intermittently, occasionally, periodically, sometimes, sporadically, infrequently, rarely, seldom
83	IRRITABLE	bad-tempered, irascible, testy, touchy, scratchy, grumpy, grouchy	sappy, pleasant, cheerful, nice
84	INSINUATED	imply, suggest, hint, intimate, whisper, indicate, sneak, infiltrate	conceal, hide, leave alone, withhold
85	INFINITY	attentively, closely, keenly, steadily, steadfastly	distractedly
86	INDUSTRY	diligence, industriousness, manufacture	idleness, indolence, laziness, lethargy, unemployment, worthlessness
87	INTOLERABLE	bitter, impossible, insufferable, unacceptable, unbearable, unendurable, insupportable	good, tolerable, acceptable, bearable
88	IMPERCEPTIBLY	observably, unnoticeably	audible, observable, recognizable, tangible, visible, clear, conspicuous, evident
89	JUDICIAL	critical, discriminative, juridical, legal	ignorance, inability, ineptness, stupidity, misunderstanding, unsoundness, inanity, indecision, misjudgment
90	JUDGMENT	assessment, discernment, judgement, judging, judicial decision, mind, opinion, perspicacity, sagaciousness, sagacity, sound judgment	
91	JUNCTION	adjunction, articulation, colligation, confluence, conjugation, conjunction, conjunction, join, joint, juncture, meeting	detachment, disunion, division, divorce, estrangement, parting, separation, severance
92	JUVENILE	adolescent, immature, jejune, juvenile person, puerile	adult
93	JEOPARDY	hazard, peril, risk	assurance, certainty, plan, safety, surety, protection
94	JEALOUSY	green-eyed monster, invidiousness, envy, resentment	benevolence, goodwill, kindness, sympathy
95	JUBILANT	elated, exultant, exulting, gleeful, joyful, joyous, prideful, rejoicing, triumphal, triumphant	depressed, discouraged, sad, sorrowful, unenthusiastic, unexcited
96	KINDRED	cognate, congeneric, incident kin, parallel affiliated, akin, associated, allied	unrelated
97	KNACK	aptitude, dexterity, flair, genius, ingenuity, propensity, quickness, savvy, skill, adroitness, aptness, bent, capacity	disinclination, inability, incapacity, ineptness, ignorance, incompetence, lack, ineptitude



97	KNICKERS	shorts, slacks, trousers, underpants, bloomers, breeches, briefs, britches, chaps	overgarment
98	KNICKKNACK	bauble, brie-a-brac, curio, ornament, souvenir, bagatelle, curiosity, device, embellishment, flummery, frill, turkelow	familiarity commonality abundance object unoriginality
99	LIKELIHOOD	probability, chance, prospect, possibility, likeliness, odds, feasibility, plausibility, conceivability	unlikelyhood, implausibility
100	LABYRINTH	maze, warren, network, complex, web, coil, entanglement	ease, line, order, organization
101	LUDICROUS	absurd, ridiculous, farcical, laughable, risible, preposterous, foolish, idiotic, stupid,inine, silly, asinine, nonsensical	common, familiar, grave, matched ordinary, reasonable, sad, sensible
102	LIMP	hobble, walk with a lump, walk with difficulty, walk lamely, walk haltingly, walk unevenly, fatter	firm, hard, rigid, activated, active, animated, energized, fresh, invigorated, lively
103	MENACED	be a threat or possible danger to, threatened, in danger	assist, guard, help, protect, save, calm
104	MUSTERED	assemble, bring together, call together, marshal, mobilize, rally, round up, raise, summon, gather, gather together, mass, collect, convene, call up, call to arms, recruit, conscript, draft	avoid, cancel, destroy, dismiss, disorganize, disperse
105	MEAN	signify, convey, denote, designate, indicate, connote, show, express, spell out, stand for, represent, symbolize, imply, purport, suggest, allude to, intimate, hint at, insinuate, drive at, refer to, cheap	decent, ignore
106	MASS	pile, heap, stack, dump, cloud, bunch, bundle, lump	dissolution, fraction, individual, one, opening part
107	MOUNTING	increase, grow, rise, escalate, soar, spiral, leap up, shoot up, rocket, climb, accumulate, accrue, pile up, build up, multiply, intensify, swell	decrease, lessen, lower, descend, alight, decline, dismount, drop, fall
108	MINIMUM	minimal, least, smallest, least possible, slightest, lowest, rock bottom, minitest, littlest	largest, maximum, most
109	MAYHEM	chaos, disorder, confusion, havoc, bedlam, pandemonium, tumult, uproar, tumult, riotousness, madhouse, hullabaloo, wild disarray, disorganization, maelstrom, trouble, disturbance, commotion, riot	calm, peace, harmony

120 MINIA TURE	anarchy, destruction, violence small-scale, scaled, down, mini, tiny, little, small, minute, baby, toy, pocket, fun- size, midget, dwarf, pygmy, minuscule, microscopic, nanoscopic, micro, diminutive, reduced, Lilliputian	baby, midget, model, toy, insignificance, pocket, edition
121 MUMBLED	mutter, murmur, speak indistinctly, talk under one's breath, speak sotto voce, talk to oneself	speak clearly, be quiet, listen,
122 MOULDED	shape, form, fashion, model, work, construct, frame, make, create, configure, manufacture, design, sculpt, sculpture, throw	combine, unite, increase, join, mend, sew
123 MENACING	threaten, be a danger to, put at risk, jeopardize, imperil, loom over	remote, aiding, assisting, helping, unthreatening
124 MEDITATED	contemplate, think about, consider, ponder, cogitate, muse	ignore, neglect, disbelieve, disregard, forget, dismiss,
125 NUISANCE	pain, pain in the neck, annoyance, pest, bother	advantage, aid cheer, comfort, convenience, good health, happiness, help joy, pleasure, delight, pleasantry
126 NAIVE	innocent, unsophisticated, artless, ingenuous, inexperienced, guileless, unworldly	aware, experienced, intelligent, knowledgeable sophisticated, leery, skeptical, wise
127 NATIVE	domestic, home-grown, home- made, home, local; indigenous, endemic	auxiliary, minor, secondary, unimportant, alien, foreign, outside
128 NEGATE	undo, reverse, annul, void, revoke, rescind, abrogate repeal, retract, countermand, overrule, over turn;	allow, approve, do, help, permit, prove, save, validate, agree, aid, assist, confirm, corroborate, enact, establish
129 NEGLIGENCE	carelessness, neglect, neglect, neglectfulness, nonperformance	accomplishment, achievement, attention, care, regard, respect, success,
130 NEMESIS	bane, curse, scourge, goddess of retributive justice, castigat, avenger, rival	advantage, associate, happiness,
131 NEUTRAL	achromatic, amoral, colorless, colourless, electroneutral, impersonal, indifferent, inert, neutralised, neutralized, nonaligned, no subjective, objective, unmoral, unreactive, viewless bicker, babble, fret, fuss, pettifog, quibble, squabble	biased, concerned, decided, interested, involved, prejudiced, agitated, excited, bright,
132 NIGGLE		agree, ignore, praise
133 OPTED FOR	choose, select, pick	ignore, reject, grow, plant, refuse
134 ON THE WRONG FOOT	to begin a relationship or project badly	
135 OCCASIONALLY	at times, from time to time, now and	always, constantly, frequently, regularly, steadily, usually

		again, now and then, on occasion, once in a while	
126	OPERATION	cognitive operation, cognitive process, functioning, mathematical operation, mathematical process, mental process, military operation, performance, procedure, process, surgery, surgical operation, surgical procedure, surgical process	cessation, idleness, inaction, inactivity, indolence, inertia, laziness, passivity, stoppage,
127	PLOPPED	flutter, plunk, dangle, droop, drop, flag, flap, flounder, hang, jerk, lop, plump, quiver, sag, slump	ascend, do well, increase, rise,
128	PRESUME	count on, guess, infer, pretend, suppose, surmise, conclude, conjecture, consider, depend, figure, gather, posit, postulate, predicate, premise, presuppose,	disbelieve, doubt, measure, disregard, distrust, forget, ignore,
129	PRECAUTIONS	safeguard, preventative/preventive measure, safety measure, insurance, defense, provision:	harm, hurt, injury, neglect, negligence, thoughtlessness,
130	PANTING	breathing with short, quick breaths; out of breath	
131	PURCHASE	buy, acquire, obtain, pick up, snap up, take, secure, procure, come by, pay for, shop for, invest in, put money into	sale, sell,
132	PERSISTED	persevere, continue, carry on, go on, keep at it, keep on, keep going, keep it up, not give up, be persistent, be determined, see/follow something through, show determination, press on/ahead, plod on, plough on, stay with something,	cease, discontinue, give up, go, halt, leave, stop, forget, quit
133	PENSIVELY	pensive, contemplative, reflective, meditative, thoughtful	
134	PRIME	galvanize, groom, inform, innervate, motivate, move, notify, prep, provoke, rehearse, stimulate, tell, train, break in	dissuade, forget, hide, listen, secret, stop, neglect
135	PLACIDLY	serene, collected, composes, limpid, untroubled	audibly, loudly, publicly
136	PREFERRED	squint, look closely/earnestly, try to see, look through narrowed eyes, narrow one's eyes, screw up one's eyes, crop up, emerge	
137	PROPELLED	spur, drive, prompt, precipitate, catapult, motivate, force, impel	discourage, dissuade, pull, repress, end, finish, stop, hinder.



139 PASSION	fervor, ardour, zeal, warmth, animation	apathy, calm, calmness, coolness, dullness, happiness, indifference, lethargy, peace, advantage, benefit, cheer
140 PRACTICALLY	almost, nearly, very nearly, virtually, just about, all but, more or less, not far from, close to, in effect, as good as	far, not close
141 PROFIT	susceptible, vulnerable, liable, inclined, give n. subject, disposed, predisposed	indifferent, unwilling, disinclined, independent, opposed, unaccustomed
142 PARAPHERNALIA	equipment, stuff, things, apparatus, tackle, kit, implements, tools, utensils, material(s), appliances, rig, outfit, accoutrements, appurtenances, impedimenta, miscellaneous articles, odds and ends	
143 PREROGATIVE	exclusive right, perquisite, privilege	duty, obligation
144 PATH	avenue, direction, highway, lane, line, passage, pathway, procedure, rail, road, roadway, route, street, track, trail, walkway, artery, beat, boulevard, byway	closing, blockage
145 PRECISION	preciseness, accuracy, nicety, rigour, exactitude	carelessness, disregard, ignorance, inaccuracy, inattention, inexactness
146 POTENTIAL	Electric potential, expected, latent, likely, possible, potency, potential difference, potential drop, potentiality, prospective, voltage	impotence, inability, incompetence, weakness, impossible, lack
147 PROMPTLY	quick, quickly, readily, right away, without delay	slowly, late, negligently
148 PIZZAZZ	dynamism, oomph, zing, allure, charisma	idleness, impotence, inability, inactivity, incapacity incompetence, indifference, ineffectiveness, lack, laziness, lethargy, lifelessness, powerlessness, reality
149 Qualitative	having to do with quality or qualities, excellence, fabulous	quantitative objective
150 QUALM	misgiving, queasiness, scruple, squeamishness	calm, calmness, certainty, collectedness, ease, happiness, peace, sureness, trust
151 QUANTITATIVE	decimal, denary, duodecimal, numeric, numerical, quantifiable, three-figure, valued	imperceptible, insignificant, undeterminable, unmeasurable
152 QUARREL	altercate, dispute, dustup, row, run-in, scrap, words, wrangle	concurrence, harmony, order, peace, quiet, approval, calmness, praise

152	QUENCH	allay, assuage, extinguish, quell, slake, squelch	be a, begin, build construct, create, give birth, help
153	QUERY	enquiry, inquiry, interrogation, question, question	answer, reply, be certain, believe, praise, trust
154	QUEUE	concatenation, echelon, file, line, order, progression, rank, row, series, string, succession	
155	QUIRK	crochet, oddity, queeriness, quirkiness	normality, usualness, inability
156	QUIVER	beat, chil, flicker, flutter, flutter, frisson, palpitate, palpitation, pulsate, quake, quivering, quivering, shakiness, shaking, shiver, shudder, thrill, tingle, trembling, vibration, vibration, waver	dulness, quiet, stillness
157	QUIZZICAL	mocking, perplexed, playful, questioning, teasing	certain, understanding
158	QUOTATION	acknowledgment, citation, credit, mention, quote, reference	whole, refusal
159	RITUALS	ceremony, rite, ceremonial, observance	difference, neglect, disagreement, discord
160	REINFORCE	strengthen, fortify, bolster up, shore up, buttress, prop up, underpin, brace, stiffen, toughen, support, hold up;	hurt, lessen, let down, play down, prevent, reduce, undermine, weaken
161	REPRIMAND	rebuke, admonish, chastise, chide, upbraid, reprove, reproach, scold, remonstrate with, berate, take to task, pull up, castigate, lambaste	commend, compliment, flatter, laud, praise, exonerate, forgive
162	RIOT	uproar, rampage, furor, tumult, commotion, upheaval, disturbance, street fight, melee, row, scuffle, fracas, fray, affray, brawl, free-for-all	comply, obey, cooperate, make peace,
163	RELUCTANTLY	with reluctance	
164	REFUGE	haven, hideaway, hideout, hiding place, protection, resort, retreat, sanctuary, security, shelter, stronghold, ambush, anchorage	closure, entrance, permanent, solid
165	REGRET	bemoan, bewail, deplore, lament, repent, rue, ruefulness, sorrow	comfort, contentment, delight, happiness, joy, pleasure, relief, satisfaction,
166	RARELY	seldom, infrequently, on rare occasions, hardly ever, scarcely ever, hardly, scarcely, almost never, once in a while, only now and then, not often,	frequently, regularly
167	REPROACHFUL	disapproving, reproving, full of	kind, nice, respectful, complimentary

168	RAGGED	reproof, critical, censorious, disparaging, disappointed, withering, accusatory, admonitory, condemnatory, castigatory, fault finding	
169	REVOLVING	tattered, in tatters, torn, ripped, split, in holes, holey, moth-eaten, frayed, worn, worn out, well worn, worn to shreds, dissonant (sound)	even, fixed, nice, polite, smooth
170	RESONANT	straggy	empt, new
171	SWARMED UP	circle go, travel, orbit, gyrate circulate, loop, wheel	static still, motionless
172	SCENARIO	deep, sonorous, full, full-bodied, vibrant, rich, clear, ringing, orotund	taut quiet
173	SWATHE	a large group of insects all moving together, gathered, crowded, assembled	thinned down, decreased, minimized
174	SUBSEQUENTLY	plot, outline, storyline, framework, structure, scheme, plan, layout	
175	STRUCK UP	swaddle, wrapping, enshroud, lap, cocoon	uncover
176	STRING	later, later on, at a later date, at some time/point in the future, at a subsequent time, afterwards, in due course, following this/that, eventually, then, next	earlier, former, prior
177	STERNLY	to begin singing	
178	SOLEMNLY	bowd stringed	individual, unstring
179	SECULENT	instrument, chain, draw, drawing string, drawstring, linguistic string, strand, string along, string of words, string up, thread, train, twine, word string	
180	SHUFFLED	earnestly, passionately, sincerely, vigorously, gravely, all joking aside, cool it cut the comedy determinedly, down, rigorously, severely	casually, funnily, lightly, minor, trivially
181	SAILED	earnestly, soberly, gravely, impressively, seriously	
		moist, tasty, yummy, divine, lush, rich, heavenly, mellow	unappetizing, dry, unjuicy,
		drag, limp, straggle, stumble, muddle, pad, scrape, scuff, scuffle, shamble, trail	rush, arrange, order, organize, run
		cruise, drift, float, fly, leave, move, navigate, reach, run, shoot, skim.	go, land, remain, stay, stop, walk



		soar, steer, sweep, boat, captain, dart, embark, flit	
182	STUNT	feat, sketch, skit, achievement, act, caper, exploit, feature	failare
183	SAUNTERED	litter, meander, mope, mosey, ramble, roam, sashay, toddle, traipse, wander, ankle, daily, drift, linger	go direct, stay, go, hurry, rush, run
184	SPLENDOUR	brilliance, brilliancy, grandeur, grandness, luster, luster, magnificence, splendor	dul., dreary, ordinary
185	SAGGED OFF		
186	SPECKLED WITH	mottled, sprinkled, dappled, flaked, freckled, motley, peppered, spotted, stippled, studded, variegated	plain, un-speckled
187	STABLE	stalwart, staunch, stout, tough, uniform, brick-wall, deep-rooted, equable, immutable, perdurable, resolute set in stone, solid as a rock, stationary, staying put, steadfast, sturdy, sure, together	temporary, undependable, unfixed, unprotected, unreliable, unsafe, unstable, untrustworthy, vulnerable, weak, changeable, changing, different, flexible, indefinite, irresolute
188	TENTATIVELY	Subject to further confirmation; not definitely.	certainly, definitely, surely
189	TACKLE	gear, equipment, apparatus, outfit, kit, rig, hardware, dive into, wade into/in	avoid, evade, shun daily, dawdle, dillydally, fiddle (around), fool, idle, lag, mess, monkey (around), play, poke, putter (around), putter (around), trifle
190	TUMULTUOUS	loud, deafening, thunderous, thundering, ear-shattering, ear-splitting, ear-piercing, uproarious, noisy, clamorous, vociferous	mild, moderate, peaceful, quiet, orderly
191	TOMFOOLERY	silliness, fooling, clowning, capering, capers, antics, pranks, tricks, buffoonery, skylarking, nonsense, horseplay, mischief, foolishness, foolery, stupidity	sense, seriousness
192	TANGLE	entangle, snarl, catch, entwine, intertwine, intertwist, twist, ravel, knot, enmesh, coil, mat, jumble, muddle	organization, simplicity line peace
193	TROUGHS	a long, narrow open container for animals to eat or drink out of, channel, conduit, duct, area b/w waves or hills	crest, peak, protuberance, cockscorn
194	TANGLED	baroque, byzantine, complex, complicate, complicated, elaborate.	noncomplex, plain, simple, uncomplicated

195	URGENT	intricate, involute, involved, knotty, labyrinthine, labyrinthine desire, wish, need, impulse, compulsion, longing, yearning, hankering, craving, appetite, hunger, thirst, lust, fancy	dislike, distaste, hate, hatred, indifference, block, deterrent
196	UNBURDENED	not burdened or disencumbered, free	dishonest, fastened, inaccessible, locked, lying, obstructed, shifty, shut, subjective, sure, unavailing, unclear, vague
197	UNPROVOKED	carried out, occurring, or acting without direct provocation, unfounded, gratuitous, undue, uncalled for, indefensible	justified, proven, reasonable, sensible, unprejudiced, warranted, called for
198	UNVENTURED	travel, journey, go, move, proceed, progress, set out, set forth, enterprise	sure thing
199	VULNERABLE	in danger, in peril, in jeopardy, at risk, endangered, unsafe, unprotected, ill-protected, unguarded	protected, safe, secure, strong, unsusceptible, closed
200	WHIPPED	having been flogged or beaten with a whip, lashed, punished	bridle, check, constrain, curb, discourage, hold, inhibit, regulate, rein (in), restrain, tame allay, calm, quiet, settle, soothe, still, subdue, tranquilize
201	WEIGHING UP	hydrostatic weighing, oppressing, overburdening	
202	WRITHING	making twisting, squirming movements or contortions of the body	relax, rest, unwind, calm (down), still
203	WAFT	drift, float, glide, whirl, travel	hold, keep, take
204	YEARNING	longing, pining, craving, desire, want, wish, hankering, urge, need, hunger, hungering, thirst, appetite, greed, lust, ache, burning, fancy, inclination, eagerness, fervor	disinterest, dislike, distaste, hate, hatred, indifference, satisfaction,
205	YELP	squeal, squawk, screech, shriek, scream, howl, yowl, wail, yell, cry, call, shout, bawl, yawl, whoop	murmur, mutter, whisper
206	YIELD	surrender, capitulate, submit, relent, admit defeat, accept defeat, concede defeat, back down, climb down, quit, give in, give up the struggle, lay down one's arms, raise, show the white flag	Bills Debt Payment
207	ZEALOUS	fervent, ardent, fervid, fiery, passionate, impassioned, devout, devoted;	cold, cool, dispassionate, frigid, happy, indifferent, unconcerned, unenthusiastic
208	ZENITH	highest point, high point, crowning	bottom, depth, lowness, nadir, start, unimportance,

209 ZEST

point, height, top, acme, peak,  
pinnacle, apex, apogee, vertex  
tip, crown, crest, summit,  
climax, culmination, maximum,  
optimum, prime, meridian, flower,  
enthusiasm, gusto, relish, zestfulness,  
appetite, eagerness, keenness,  
avidity, zeal, fervour, ardour, passion,  
love, enjoyment, joy, delight.

blandness, boredom, dullness,  
idleness, lethargy, indifference,  
laziness

## Practice Vocabulary

<b>Amazing</b>	incredible, unbelievable, improbable, fabulous, wonderful, fantastic, astonishing, astounding, extraordinary
<b>Anger</b>	enrage, infuriate, arouse, nettles, exasperate, inflame, madden, Angry, mad, furious, enraged, excited, wrathful, indignant, exasperated, aroused, inflamed
<b>Answer</b>	reply, respond, retort, acknowledge
<b>Ask</b>	question, inquire of, seek information from, put a question to, demand, request, expect, inquire, query, interrogate, examine, quiz
<b>Awful</b>	dreadful, terrible, abominable, bad, poor, unpleasant
<b>Bad</b>	evil, immoral, wicked, corrupt, sinful, depraved, rotten, contaminated, spoiled, tainted, harmful, injurious, unfavorable, defective, inferior, imperfect, substandard, faulty, improper, inappropriate, unsuitable, disagreeable, unpleasant, cross, nasty, unfriendly, irascible, horrible, atrocious, outrageous, scandalous, infamous, wrong, noxious, sinister, putrid, sordid, deplorable, dismal, gross, heinous, notorious, base, obnoxious, detestable, despicable, contemptible, foul, rank, ghastly, execrable
<b>Beautiful</b>	pretty, lovely, handsome, attractive, gorgeous, dazzling, splendid, magnificent, comely, fair, ravishing, graceful, elegant, fine, exquisite, aesthetic, pleasing, shapely, delicate, stunning, glorious, heavenly, resplendent, radiant, glowing, booming, sparkling
<b>Begin</b>	start, open, launch, initiate, commence, inaugurate, originate
<b>Big</b>	enormous, huge, immense, gigantic, vast, colossal, gargantuan, large, sizable, grand, great, tall, substantial, mammoth, astronomical, ample, broad, expansive, spacious, stout, tremendous, titanic, mountainous
<b>Brave</b>	courageous, fearless, dauntless, intrepid, plucky, daring, heroic, valorous, audacious, bold, gallant, valiant, doughty, mettlesome
<b>Break</b>	fracture, rupture, shatter, smash, wreck, crash, demolish, atomize
<b>Bright</b>	shining, shiny, gleaming, brilliant, sparkling, shimmering, radiant, vivid, colorful, lustrous, luminous, incandescent, intelligent, knowing, quick-witted, smart, intellectual
<b>Calm</b>	quiet, peaceful, still, tranquil, mild, serene, smooth, composed, collected, unruffled, level-headed, unexcited, detached, aloof
<b>Come</b>	approach, advance, near, arrive, reach
<b>Cool</b>	chilly, cold, frosty, wintry, icy, frigid



crooked	bent, twisted, curved, hooked, crooked
cry	shout, yell, wail, scream, roar, bellow, weep, wail, sob, howl
cut	gash, slash, prick, nick, sever, slice, carve, cleave, slit, chop, chop, up, slice
dangerous	perilous, hazardous, risky, uncertain, unsafe
dark	shadowy, unlit, murky, gloomy, dim, dusky, shrouded, sunless, black, dismal, sad
decide	determine, settle, choose, resolve
definite	certain, sure, positive, determined, clear, distinct, obvious
delicious	savory, delectable, appetizing, nice, tasty, scrumptious
Describe	palatable, delightful, enjoyable, toothsome, exquisite portray, characterize, picture, narrate, relate, recount, represent, report, record
destroy	ruin, demolish, raze, waste, kill, slay, end, extinguish
difference	disagreement, inequality, contrast, dissimilarity, incompatibility
do	exceed, exact, carry out, finish, conclude, effect, accomplish, achieve, attain
Dull	boring, tiring, tiresome, uninteresting, slow, dim, stand, unimaginative, lifeless, dead, insensible, tedious, wearisome, lifeless, expressionless, plain, monotonous, laudrum, drear
eager	<b>keen, fervent, enthusiastic, involved, interested, alive to</b>
End	stop, finish, terminate, conclude, close, have, cessation, discontinuance
Enjoy	appreciate, delight, take pleasure in, enjoy, savor, relish, devour, savor, like
Explain	elaborate, clarify, explain, interpret, justify, account for
Fair	just, impartial, unbiased, objective, unprejudiced, honest
fall	drop, descend, plunge, topple, tumble
False	fake, fraudulent, counterfeit, spurious, untrue, unfounded, erroneous, deceptive, groundless, <b>fallacious</b>
famous	well-known, renowned, celebrated, famed, eminent, distinguished, noted, notorious
Fast	quick, rapid, speedy, fleet, hasty, snappy, mercurial, swiftly, rapidly, quickly, snappily, speedily, hasty, split, posthaste, hastily, expeditiously, like a flash
Fat	stout, corpulent, fleshy, beefy, portly, plump, full, rotund, tubby, pudgy, chubby, chunky, <b>burly, bulky, elephantine</b>
fear	fright, dread, terror, alarm, dismay, anxiety, scare, awe, horror, panic, apprehension
fly	soar, hover, flit, wing, flee, waft, glide, coast, skim, sail, cruise
funny	humorous, amusing, droll, comic, comical, laughable, silly

<b>Get</b>	acquire, obtain, secure, procure, gain, fetch, find, score, accumulate, win, earn, rep. curer bag, derive, collect, gather, gleam, pick up, accept, come by, regain, salvage
<b>Go</b>	recede, depart, fade, disappear, move, travel, proceed
<b>Good</b>	excellent, fine, superior, wonderful, marvelous, qualified, suited, suitable, apt, proper generous, kindly, friendly, gracious, obliging, pleasant, agreeable, pleasurable, satisfactory, well behaved, obedient, honorable, reliable, trustworthy, safe, favorable, profitable, advantageous, righteous, expedient, helpful, valid, genuine, ample, salubrious, estimable beneficial, splendid, great, noble, worthy, first-rate, top-notch, grand, sterling, superb respectable, edifying
<b>Great</b>	noteworthy, worthy, distinguished, remarkable, grand, considerable, powerful, much, more
<b>Gross</b>	improper, rude, coarse, indecent, crude, vulgar, outrageous, extreme, grievous, shameful uncouth, obscene, low
<b>Happy</b>	pleased, contented, satisfied, delighted, elated, joyful, cheerful, ecstatic, jubilant, gay, merry gratified, glad, blissful, overjoyed
<b>Hate</b>	despise, loathe, detest, abhor, disavor, dislike, disapprove, abominate
<b>Have</b>	hold, possess, own, contain, acquire, gain, maintain, believe, bear, beget, occupy, absorb enjoy
<b>Help</b>	aid, assist, support, encourage, back, wait on, attend, serve, relieve, succor, benefit, befriend, abet
<b>Hide</b>	conceal, cover, mask, cloak, camouflage, screen, shroud, veil
<b>Hurry</b>	rush, run, speed, race, hasten, urge, accelerate, bustle
<b>Hurt</b>	damage, harm, injure, wound, distress, afflict, pain
<b>Idea</b>	thought, concept, conception, notion, understanding, opinion, plan, view, belief
<b>Important</b>	necessary, vital, critical, indispensable, valuable, essential, significant, primary, principal, considerable, famous, distinguished, notable, well-known
<b>Interesting</b>	fascinating, engaging, sharp, keen, bright, intelligent, animated, spirited, attractive, inviting intriguing, provocative, thought-provoking, challenging, inspiring, involving, moving, titillating, tantalizing, exciting, entertaining, piquant, lively, racy, spicy, engrossing, absorbing, consuming, gripping, arresting, enthralling, spellbinding, curious, captivating enchanted, bewitching, appealing
<b>Keep</b>	hold, retain, withhold, preserve, maintain, sustain, support
<b>Kill</b>	slay, execute, assassinate, murder, destroy, cancel, abolish
<b>Lazy</b>	indolent, slothful, idle, inactive, sluggish
<b>Little</b>	tiny, small, diminutive, shrimp, runt, miniature, puny, exiguous, dinky, cramped, limited bitsy, microscopic, slight, petite, minute
<b>Look</b>	gaze, see, glance, watch, survey, study, seek, search for, peek, peep, glimpse, stare, contemplate, examine, gape, ogle, scrutinize, inspect, leer, behold, observe, view, witness, perceive, spy, sight, discover, notice, recognize, peer, eye, gawk, peruse, explore

Love	like, admire, esteem, fancy, care for, cherish, adore, treasure, worship, appreciate, savor
Make	create, originate, invent, beget, form, construct, design, fabricate, manufacture, produce, build, develop, do, effect, execute, compose, perform, accomplish, earn, gain, obtain, acquire, get
Mark	label, tag, price, ticket, impress, effect, trace, imprint, stamp, brand, sign, note, heed, notice, designate
Mischief	prankish, playful, naughty, roguish, waggish, impish, sportive
Move	plod, go, creep, crawl, inch, poke, drag, toddle, shuffle, trot, dawdle, walk, trapse, mosey, jog, plug, trudge, slump, lumber, trail, lag, run, sprint, trip, bound, hotfoot, high-tail, streak, stride, tear, breeze, whisk, rush, dash, dart, bolt, fling, scamper, scurry, skedaddle, scoot, scuttle, scramble, race, chase, hasten, hurry, hump, gallop, lope, accelerate, stir, budge, travel, wander, roam, journey, trek, ride, spin, slip, glide, slide, slither, coast, flow, sail, saunter, hobble, amble, stagger, paddle, slouch, prance, straggle, meander, perambulate, waddle, wobble, pace, swagger, promenade, lunge
Moody	temperamental, changeable, short-tempered, glum, morose, sullen, mopish, irritable, testy, peevish, fretful, spiteful, sulky, touchy
Neat	clean, orderly, tidy, trim, dapper, natty, smart, elegant, well-organized, super, desirable, spruce, shipshape, well-kept, shapely
New	fresh, unique, original, unusual, novel, modern, current, recent
Old	feeble, frail, ancient, weak, aged, used, worn, dilapidated, ragged, faded, broken-down, former, old-fashioned, outmoded, passed, veteran, mature, venerable, primitive, traditional, archaic, conventional, customary, stale, musty, obsolete, extinct
Part	portion, share, piece, allotment, section, fraction, fragment
Place	space, area, spot, plot, region, location, situation, position, residence, dwelling, set, site, station, status, state
Plan	plot, scheme, design, draw, map, diagram, procedure, arrangement, intention, device, contrivance, method, way, blueprint
Popular	well-liked, approved, accepted, favorite, celebrated, common, current
Predicament	quandary, dilemma, pickle, problem, plight, spot, scrape, jam
Put	place, set, attach, establish, assign, keep, save, set aside, effect, achieve, do, build
Quiet	silent, still, soundless, mute, tranquil, peaceful, calm, restful
Right	correct, accurate, factual, true, good, just, honest, upright, lawful, moral, proper, suitable, apt, legal, fair
Run	race, speed, hurry, hasten, sprint, dash, rush, escape, elope, flee
Say/Tell	inform, notify, advise, relate, recount, narrate, explain, reveal, disclose, divulge, declare, command, order, bid, enlighten, instruct, insist, teach, train, direct, issue, remark, converse, speak, affirm, suppose, utter, negate, express, verbalize, voice, articulate, pronounce, deliver, convey, impart.



	assert, state, allege, mutter, mumble, whisper, sigh, exclaim, yell, sing, yelp, snarl, hiss, snort, roar, bellow, thunder, boom, scream, shriek, screech, squawk, whine, philosophize, stammer, stutter, lisp, drawl, jabber, protest, announce, swear, vow, content, assure, deny, dispute
<b>Scared</b>	afraid, frightened, alarmed, terrified, panicked, fearful, unnerved, insecure, timid, shy, jumpy, disquieted, worried, vexed, troubled, disturbed, horrified, terrorized, shocked, petrified, haunted, timorous, shrinking, tremulous, stupefied, paralyzed, stunned, appalled
<b>Show</b>	display, exhibit, present, note, point to, indicate, explain, reveal, prove, demonstrate, expose
<b>Slow</b>	unhurried, gradual, leisurely, late, behind, tedious, slack
<b>Stop</b>	cease, halt, stay, pause, discontinue, conclude, end, finish, quit
<b>Story</b>	tale, myth, legend, fable, yarn, account, narrative, chronicle, epic, saga, anecdote, record
<b>memoir</b> <b>Strange</b>	odd, peculiar, unusual, unfamiliar, uncommon, queer, weird, outlandish, curious, unique, exclusive, irregular
<b>Take</b>	hold, catch, seize, grasp, win, capture, acquire, pick, choose, select, prefer, remove, steal, rob, engage, bewitch, purchase, buy, retract, recall, assume, occupy, consume
<b>Tell</b>	disclose, reveal, show, expose, uncover, relate, narrate, inform, advise, explain, divulge, declare, command, order, bid, recount, repeat
<b>Think</b>	dge, deem, assume, believe, consider, contemplate, reflect, mediate
<b>Trouble</b>	distress, anguish, anxiety, worry, wretchedness, pain, danger, peril, disaster, grief, misfortune, difficulty, concern, pains, inconvenience, exertion, effort
<b>True</b>	accurate, right, proper, precise, exact, valid, genuine, real, actual, trusty, steady, loyal, dependable, sincere, staunch
<b>Ugly</b>	hideous, frightful, frightening, shocking, horrible, unpleasant, monstrous, terrifying, gross, grisly, ghastly, horrid, unsightly, plain, homely, evil, repulsive, repugnant, gruesome
<b>Unhappy</b>	miserable, uncomfortable, wretched, heart-broken, unfortunate, poor, downhearted, sorrowful, depressed, dejected, melancholy, glum, gloomy, dismal, discouraged, sad
<b>Use</b>	employ, utilize, exhaust, spend, expend, consume, exercise
<b>Wrong</b>	incorrect, inaccurate, mistaken, erroneous, improper, unsuitable

- A) 390 nm  
B) 590 nm  
C) 690 nm  
D) 790 nm  
E) 990 nm
18. The ratio of the angles subtended by the image as seen through the optical device so that subtended by the object at the unaided eye is known as:  
A) Magnifying power  
B) Angular magnification  
C) Simple magnification  
D) Both A and B
19. Those waves in which the particles of medium have displacement along the direction of propagations of waves are known as:  
A) Longitudinal waves  
B) Transverse waves  
C) Simple waves  
D) Electromagnetic waves
20. A pipe has a length of 1m. Determine the frequencies of the fundamental and first two harmonic if the pipe is opened at both ends. (speed of sound in air = 340 m/s)  
A) 170 Hz, 140 Hz, 510 Hz  
B) 120 Hz, 220 Hz, 390 Hz  
C) 90 Hz, 230 Hz, 440 Hz  
D) 210 Hz, 410 Hz, 510 Hz
21. At points where the displacements of two waves cancel each other's effect, the path difference is an odd integral multiple of half the wavelength. This effect is known as:  
A) Constructive interference  
B) Destructive interference  
C) Stationary interference  
D) Simple interference
22. A steel wire 12 mm diameter is fastened to a log and then pulled by tractor. The length of steel wire between the log and the tractor is 11m. A force of 10,000 N is required to pull the log. What is the stress in the wire?  
A) 33.12 MPa  
B) 44.12 Mpa  
C) 66.15 Mpa  
D) 77.29 Mpa  
E) 88.46 Mpa
23. Identify the postulate/s which help to formulate a mathematical model of gases. (I) A finite volume of gas consists of very large number of molecules. (II) The size of the molecules is much smaller than the separation between molecules. (III) Molecules do not exert force on each other except during a collision.  
A) I only  
B) II only  
C) III only  
D) I & II only

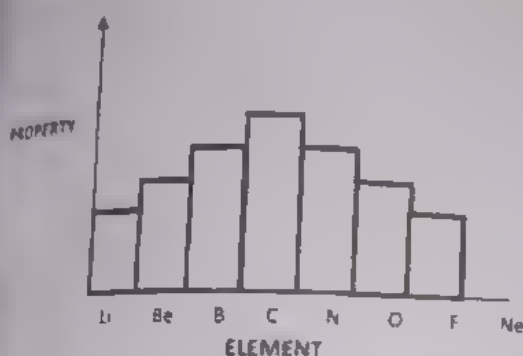
- E) I, II, & III
24. The turbine in a steam power takes steam from a boiler at 427°C and exhaust into a temperature reservoir at 77°C. What is the maximum possible efficiency?  
A) 10%  
B) 20%  
C) 30%  
D) 50%  
E) 70%
25. If a process cannot be retraced in the backward direction by reversing the controlling factors, it is a/an:  
A) Reversible process  
B) Irreversible process  
C) Efficient process  
D) Entropic process
26. A digital system deals with quantities or variables which have only two discrete values or states. Identify the example/s of such quantities. (I) A switch can be either open or closed. (II) A bulb can be either off or on. (III) A certain statement can be either true or false.  
A) I only  
B) II only  
C) I and II only  
D) III only  
E) I, II & III
27. The potential difference between the terminals of a battery in open circuit is 2.2V. When it is connected across a resistance of 5.0  $\Omega$ , the potential falls to 1.8V. What is the current of battery?  
A) 0.36 A  
B) 2.36 A  
C) 3.39 A  
D) 4.49 A  
E) 9.49 A
28. A platinum wire has resistance of 10  $\Omega$  at 0°C and 20  $\Omega$  at 273°C. What is the value of temperature coefficient of resistance of platinum?  
A)  $3.66 \times 10^{-3} \text{ K}^{-1}$   
B)  $4.66 \times 10^{-3} \text{ K}^{-1}$   
C)  $6.31 \times 10^{-3} \text{ K}^{-1}$   
D)  $7.42 \times 10^{-3} \text{ K}^{-1}$   
E)  $9.49 \times 10^{-3} \text{ K}^{-1}$
29. What shunt resistance must be connected across a galvanometer of 50.0  $\Omega$  resistance which gives full scale deflection with 2.0 mA current, so as to convert it into an ammeter of range 10.0 A?  
A) 105  $\Omega$   
B) 0.01  $\Omega$   
C) 2.5  $\Omega$   
D) 3.9  $\Omega$   
E) 4.7  $\Omega$
30. Find the radius of an orbit of an electron moving at a rate of  $2.0 \times 10^7 \text{ m/s}$  in magnetic field of  $1.2 \times 10^{-3} \text{ T}$ .  
A)  $3.15 \times 10^{-2} \text{ m}$   
B)  $4.25 \times 10^{-2} \text{ m}$   
C)  $9.93 \times 10^{-2} \text{ m}$   
D)  $17.77 \times 10^{-2} \text{ m}$   
E)  $19.91 \times 10^{-2} \text{ m}$

Part of the periodic table is shown. The letters are not the symbols of the elements;

[illegible]

Which statement is correct?

- chart shows the period of elements from



Which property of these elements is shown on the chart?

- A) The number of electrons used in bonding  
B) The number of orbits holding electrons  
C) The (proton) atomic number  
D) The relative atomic number

$\alpha$ -helix are secondary structures characterized by:

- A) Intramolecular hydrogen bonds  
B) Disulfide bonds  
C) A nppled effect  
D) Intermolecular hydrogen bond

A metal sulphate contains 9.87% of M. This sulphate is isomorphous with  $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ . Determine the atomic weight of the metal M.

- A) 24,31  
B) 34,31  
C) 28,28  
D) 44,41

8. 100 cm<sup>3</sup> of oxygen is collected over water at 23°C and 800 mm pressure. If vapour pressure of water vapours at 23°C is 21.00 mm, then calculate volume of the gas at NTP.

- A) 100 c.c  
B) 94.53 c.c  
C) 150 c.c  
D) 90.0 c.c

D) 90.0 c.c

g of the non-volatile substance (molecular mass  $M$ ) is dissolved in 250 g of benzene. If  $K_b$  is the

NUMS and National MDCAT by All Sudais

molar elevation constant, the value of  $\Delta T$  is given by:

- A)  $4M, K, Y$   
B)  $4K, Y, M$   
C)  $K, Y, 4M$   
D)  $K, Y, M$

7. A mixture of ethanol and propanol has a vapour pressure of 290 mm at  $27^\circ\text{C}$ . If mole fraction of ethanol is 0.65, then what will be its vapour pressure if vapour pressure of pure propanol is 210 mm?

- A) 333.1 mm  
B) 441.5 mm  
C) 1890.2 mm  
D) None of the above

8. At 25°C, the equilibrium constant  $K_1$  and  $K_2$  in the reactions  $2\text{NH}_3 \rightarrow \text{N}_2 + 3\text{H}_2$ ,  $\frac{1}{2}\text{N}_2 + \frac{3}{2}\text{H}_2 \rightleftharpoons \text{NH}_3$ ,  $K_1$  are related as:

- A)  $K_1 = K_2$       B)  $K_1 = \frac{1}{K_2^2}$   
C)  $K_2 = \frac{1}{K_1^2}$       D)  $K_1 = \frac{1}{K_2}$

9. For the reaction  $\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$ , the value of  $K$  is 0.0842 at 3500 K. Calculate the fraction of equilibrium mixture of  $\text{N}_2$  and  $\text{O}_2$  converted into  $\text{NO}$ .

- A) 15.0%                      B) 16.3%  
C) 16.5%                      D) 16.9%

10. Chlorine in vinyl chloride is not very reactive because:

- A) C - Cl is partial double bond  
B) Resonance  
C)  $sp^2$  hybridized carbon has more acidic character than  $sp^3$  hybridized carbon  
D) All of the above

11. One of the isomers of  $C_4H_{10}$  A) has chiral carbon but on hydrogenation it loses chirality, so A is:

- A) 2-Methyl-2-pentone  
B) 2, 3-Dimethyl-2-butene  
C) 3-Methyl-1-pentone  
D) 3, 3-Dimethyl-2-butene

12. An equimolar quantities of ethanol and methanol are heated with conc.  $H_2SO_4$ . The product formed is:

- A)  $\text{CH}_3\text{OCH}_3$   
B)  $\text{C}_7\text{H}_5\text{OCH}_3$   
C)  $\text{C}_7\text{H}_{15}\text{OC}_2\text{H}_5$   
D) All of the above

13. Which one of the following phenol is more soluble in aq.  $\text{NaHCO}_3$ ?

- A) 2, 4-Dihydroxy acetophenone  
B) 2,4,6-Tricyano phenol  
C) 3,4-Dicyano phenol  
D) p-Cyano phenol

14. A water soluble compound of molecular formula  $C_7H_6O$  gives yellow crystalline solid on heating with  $I_2$  and  $Na_2CO_3$ . The compound is;

- A)  $\text{CH}_3\text{CH}_2\text{CHO}$  B)  $\text{CH}_3\text{OCH}=\text{CH}_2$



NI MS and National MDC AT by Ali Sudais

1. If agreement is simply abstract as there is A in off thought and coherence in C ideas and in D vision.  
The workers were raising A much B hue and cry when their demands C were turned away D.

6. A [ 7. D ]

8. D [ 9. A ] 10. D

2010

1. Suddenly he stopped A at the edge of the meadow, taking his pocket knife B from his pocket C, and cut a wisp of alfalfa D.

2. The study A of population growth B indicates one of the C greatest paradox D of our time.

3. Among the Western nations A, the decline in the death rate is followed B after an interval by the reduction in the birth C rate, so that the population is not now growing D so fast.

4. In view of increasing hazards with A our national security it is B the duty of

6. D [ 7. C ] 8. A [ 9. A ] 10. D

2009

1. He is better than A all the boys in the class in studies as well as B in sports, and bags C big prizes in various fields D.

2. One must not depend too much A upon one's hard work B, as provident C also plays its part D.

3. His first adventure A was to go round through B the world at minimum cost D.

4. has been working A in this department since B the last five years C without any break D.

2008

1. did not A guess how closely B he had kept C in touch with across D the road

2. believed that A if only germs were B excluded of wounds C, inflammation was D averted

3. than test his hair flutter A and the tissues of body drew B tight as if he were standing C at the center of a vacuum D.

4. came to the hurdles A that he remember B over which once C he had won so easy D a victory.

5. is mean A by birth-rate and death rate B how do C they affect the population? D

10. She had left A him with a calmness and a poise B that accord C well with his own inward D emotions.

5. D [ 6. C ] 7. B [ 8. B ] 9. D [ 10. C ]

In each of the following questions, four alternative sentences are given. Choose the CORRECT one and fill the circle corresponding to that letter in the MCQ Response form.

2019

8)

- A) I was been to America for medical check up  
B) I had been to America for medical checkup  
C) I have been to America for medical checkup  
D) I has been to America for medical checkup

9)

- A) After breaking the glass, Ruby said, 'please don't tell on me'  
B) After breaking the glass, Ruby said, 'please dont tel me  
C) After breaking the glass, Ruby said, 'please don't tell on me'  
D) After breaking the glass, Ruby said, 'please dont tell on me'

10)

- A) It is healthful to eat a variety of food  
B) It were healthful to eat a variety of food.  
C) It is healthful to ate a variety of food  
D) It were a healthful to eat a variety of food

8.C

9.C

10.A

11.C

12.A

13.D

2018

Each of the following questions, 4 alternative sentences are given. Choose the CORRECT and fill the circle corresponding to that letter in the MCQ'S Response form

11)

- A) There is no clearly defined not is there an attempt to establish a strong 'hero figure'  
B) There is neither clearly defined plot not is there an attempt to establish a strong 'hero figure'  
C) There is not clearly defined plot not is there any attempt to establish a strong 'hero figure'  
D) There is not either clearly defined plot not is there an attempt to establish a strong 'hero figure'

12)

- A) China is now the fashion around the world  
B) China is now the fusion around the world  
C) China is now the function around the world  
D) China is now the dissate atr und the work.

13)

- A) The sufferer becomes depressed and feels very  
B) The sufferer becomes depress and feels very

- 11) A) We used to play football when we lived in  
B) We are used to play football when we lived in  
C) We used to play football when we lived in  
D) We have use to play football when we lived in

12)

- A) He asked, 'is your brother  
B) He asked, 'is your brother  
C) He asked, 'is your brother  
D) He asked, 'is your brother home?'

13)

- A) We hadn't the foggy notion of the worker who made  
B) We hadnt the foggiest notion of the worker who made  
C) We hadnt the foggiest notion of the worker who made  
D) We hadnt the foggiest notion of the worker who made

12.A

13.D

- A) A common cause of failure is a mistaking ambition of the boy on the part of the  
B) A common cause of failure is a mistaken ambition of the boy on the part of the  
C) A common cause of failure is a mistaken ambition of the boy on the part of the  
D) A common cause of failure is a mistake ambition of the boy on the part of the parents

14)

- A) I learned over the parapet and looked down  
B) I learned at the parapet and looked down  
C) I learned against the parapet and looked down  
D) I learned down the parapet and looked down

15)

- A) The sufferer becomes depressed and feels very  
B) The sufferer becomes depress and feels very

12.A becomes depressed and feeling very ill  
12.B becomes depressed and feels very ill  
12.C looked on me in some alarm  
12.D looked on me with some alarm  
12.E looked at me with some alarm  
12.F looked at me with some alarm

13.A the end of the month he took to his bed  
13.B the end of the month he took to his bed  
13.C the end of the month he took to his bed  
13.D the end of the month he took to his bed  
13.E the end of the month he took to his bed  
13.F the end of the month he took to his bed

14.A made me another plough  
14.B made me another plough  
14.C made me another plough  
14.D made me another plough  
14.E made me another plough  
14.F made me another plough

15.A 12.A 13.C 14.C 15.A

2017 Reconduct

16.A satisfy you're conscience by writing a cheque  
16.B satisfy you're conscience by writing a cheque  
16.C satisfy you're conscience by writing a cheque  
16.D satisfy you're conscience by writing a cheque  
16.E satisfy you're conscience by writing a cheque  
16.F satisfy you're conscience by writing a cheque

17.A the post the Court acrobat and never had had  
17.B the post the Court acrobat and never have had  
17.C the post the Court acrobat and never has had  
17.D the post the Court acrobat and never had had  
17.E the post the Court acrobat and never have had  
17.F the post the Court acrobat and never has had

18.A devoted his attention to fishing and making  
18.B devoted his attention to fishing and making  
18.C devoted his attention to fishing and making  
18.D devoted his attention to fishing and making  
18.E devoted his attention to fishing and making  
18.F devoted his attention to fishing and making

19.A his companions in the new school  
19.B his companions in the new school  
19.C his companions in the new school  
19.D his companions in the new school  
19.E his companions in the new school  
19.F his companions in the new school

19.A I lost my little plough in a furrow and I cried and cried  
19.B I lost my little plough in a furrow and I cried and cried  
19.C I lost my little plough in a furrow and I cried and cried  
19.D I lost my little plough in a furrow and I cried and cried  
19.E I lost my little plough in a furrow and I cried and cried  
19.F I lost my little plough in a furrow and I cried and cried

20.A In my experience, the awakening of a clear judgement  
20.B In my experience, the awakening of a clear judgement  
20.C In my experience, the awakening of a clear judgement  
20.D In my experience, the awakening of a clear judgement  
20.E In my experience, the awakening of a clear judgement  
20.F In my experience, the awakening of a clear judgement

21.A In my experience, the awakening of a clear judgement  
21.B In my experience, the awakening of a clear judgement  
21.C In my experience, the awakening of a clear judgement  
21.D In my experience, the awakening of a clear judgement  
21.E In my experience, the awakening of a clear judgement  
21.F In my experience, the awakening of a clear judgement

22.A Oppressive it was, too, with the heaviness of a storm  
22.B Oppressive it was, too, in the heaviness of a storm  
22.C Oppressive it was, too, up the heaviness of a storm  
22.D Oppressive it was, off the heaviness of a storm  
22.E Oppressive it was, too, with the heaviness of a storm  
22.F Oppressive it was, too, in the heaviness of a storm

23.A 16.D 17.A 18.A 19.C 20.A

24.A Initially, He devoted his attention to fish and making  
24.B Initially, He devoted his attention to fish and making  
24.C Initially, He devoted his attention to fish and making  
24.D Initially, He devoted his attention to fish and making  
24.E Initially, He devoted his attention to fish and making  
24.F Initially, He devoted his attention to fish and making

25.A

26.A Don't you stuff your head by things you do not  
26.B Don't you stuff your head by things you do not  
26.C Don't you stuff your head by things you do not  
26.D Don't you stuff your head by things you do not  
26.E Don't you stuff your head by things you do not  
26.F Don't you stuff your head by things you do not

27.A Then he set down in corner and reminded quiet  
27.B Then he set down in corner and reminded quiet  
27.C Then he set down in corner and reminded quiet  
27.D Then he set down in corner and reminded quiet  
27.E Then he set down in corner and reminded quiet  
27.F Then he set down in corner and reminded quiet





1) A horse filled lot of column inches in the national

2) A horse filled a lot of column inches to the national

3) A horse filled lot of column inches to the national

20)

A) The horse reared off on its hind legs

B) The horse reared at on its hind legs

C) The horse reared up on its hind legs

D) The horse reared down on its hind legs

12.B	13.C	14.B	15.C	16.A	17.D	18.B	19.A	20.C
------	------	------	------	------	------	------	------	------

2016

11)

- A) Inside a carton was a push-button unit fastened with a small wooden box.  
 B) Inside a carton was a push-button unit fastened by a small wooden box.  
 C) Inside a carton was a push-button unit fastened to a small wooden box.  
 D) Inside a carton was a push button unit fastened along a small wooden box.

12)

- A) They both looked to one another, startled by all they had just finished saying.  
 B) They both looked to each another, startled by all they had just finish saying.  
 C) They both looked to each another, startled by all they had just finish saying.  
 D) They both looked to each another, startled by all they had just finished saying.

13)

- A) The lovely sentiments we go through repeating!  
 B) The lovely sentiments we go about repeating!  
 C) The lovely sentiments we go in repeating!  
 D) The lovely sentiments we go for repeating!

14)

- A) In a short while quiet a large crowd had been collected.  
 B) In a short while quiet a large crowd had collected.  
 C) In a short while quiet large crowd had collected.  
 D) In a short while quiet the large crowd had been collecting

15)

- A) She watched all the important matches in the Brookfield ground.  
 B) She watched all the important matches on the Brookfield ground.  
 C) She watched all the important matches from the Brookfield ground.  
 D) She watched all the important matches within the Brookfield ground.

16)

11.C | 12.D | 13.B | 14.B | 15.B

2015

11.

- A) Tourism is burgeoned over the last fifteen years.  
 B) Tourism will burgeoned over the last fifteen years.  
 C) Tourism have burgeoned over the last fifteen years.  
 D) Tourism has burgeoned over the last fifteen years.

12.

- A) His remains were interred in the new cemetery.

- A) Something had happened, something whose significance had yet to be reckoned.  
 B) Something had happened, something whose significance had yet was reckoned.  
 C) Something had happened, something whose significance had yet to be reckoned.  
 D) Something had happened, something whose significance had yet to be reckoned

17)

- A) With the bright light, still in her eyes, she moved quick out of the door.  
 B) With the bright light, still in her eyes, she moved quick out to the door.  
 C) With the bright light, still in her eyes, she moved quickly out to the door.  
 D) With the bright light, still in her eyes, she moved quickly out of the door.

18)

- A) His faculties were all unimpaired, and he had personal worries of any kind.  
 B) His faculties were all unimpaired, and he had personal worries of any kind.  
 C) His faculties were all unimpaired, and he had personal worry of any kind.  
 D) His faculties were all unimpaired, and he had personal worries of any kind.

19)

- A) It was hard to him to speak loud but he managed murmur something.  
 B) It was hard to him to speak loud, but he managed murmur something.  
 C) It was hard to him to speak loud, but he managed murmur something.

20)

- D) It was hard to him to speak loud, but he managed upon murmur something.  
 A) There was a little money saved up beside  
 B) There was little money saved in beside.  
 C) There was little money saved up beside.  
 D) There was a little money saved up besides.

16.C | 17.B | 18.D | 19.C | 20.D

ACA & Ali Series  
 13) They had  
 14) She had  
 15) Empty of  
 16) The cheer  
 17) He made  
 18) He made  
 19) He made  
 20) He made  
 21) He made  
 22) He made  
 23) He made  
 24) He made  
 25) He made  
 26) He made  
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 87) He made  
 88) He made  
 89) He made  
 90) He made  
 91) He made  
 92) He made  
 93) He made  
 94) He made  
 95) He made  
 96) He made  
 97) He made  
 98) He made  
 99) He made  
 100) He made



14. Ali had turned on the upper steaks when the telephone rang.
15. Ali had turned over the upper steaks when the telephone rang.
16. Ali had turned into the upper steaks when the telephone rang.
17. Ali had turned in the upper steaks when the telephone rang.

18. Ali had turned on the upper steaks when the telephone rang.
19. Ali had turned over the upper steaks when the telephone rang.
20. Ali had turned into the upper steaks when the telephone rang.
21. Ali had turned in the upper steaks when the telephone rang.

22. Ali had turned on the upper steaks when the telephone rang.
23. Ali had turned over the upper steaks when the telephone rang.
24. Ali had turned into the upper steaks when the telephone rang.
25. Ali had turned in the upper steaks when the telephone rang.

26. Ali had turned on the upper steaks when the telephone rang.
27. Ali had turned over the upper steaks when the telephone rang.
28. Ali had turned into the upper steaks when the telephone rang.
29. Ali had turned in the upper steaks when the telephone rang.
30. Ali had turned on the upper steaks when the telephone rang.

2014

31. Ali had turned on the upper steaks when the telephone rang.
32. Ali had turned over the upper steaks when the telephone rang.
33. Ali had turned into the upper steaks when the telephone rang.
34. Ali had turned in the upper steaks when the telephone rang.
35. Ali had turned on the upper steaks when the telephone rang.

36. Ali had turned on the upper steaks when the telephone rang.
37. Ali had turned over the upper steaks when the telephone rang.
38. Ali had turned into the upper steaks when the telephone rang.
39. Ali had turned in the upper steaks when the telephone rang.
40. Ali had turned on the upper steaks when the telephone rang.

41. Ali had turned on the upper steaks when the telephone rang.
42. Ali had turned over the upper steaks when the telephone rang.
43. Ali had turned into the upper steaks when the telephone rang.
44. Ali had turned in the upper steaks when the telephone rang.
45. Ali had turned on the upper steaks when the telephone rang.

# NUNS and National MDC AT by Ali Sudais

- A) I am looking forward to securing excellent marks in MCAI.
- B) I am looking forward to securing excellent marks in MCAI.
- C) I am looking forward to securing excellent marks in MCAI.
- D) I am looking forward to securing excellent marks in MCAI.

19.

- A) The study of population growth indicates one of the greatest paradoxes of our time.
- B) The study of population growth indicates one of the greatest paradoxes of our time.
- C) The study of population growth indicates one of the greatest paradoxes of our time.
- D) The study of population growth indicates one of the greatest paradoxes of our time.

20.

- A) In North Africa, he barely escaped assassination at the hand of the governor of the province.
- B) In North Africa, he barely escaped from assassination at the hands of the governor of the province.
- C) In North Africa, he barely escaped from assassination at the hand of the governor of the province.
- D) In North Africa, he barely escaped assassination at the hands of the governor of the province.

11.D 12.A 13.C 14.B 15.A 16.B 17.B

18.B 19.C 20.D

- D) Shahid was battered Anwar down submission.

14.

- A) Pride was an intrinsic component of his personal makeup.
- B) Pride was a intrinsic component of his personal makeup.
- C) Pride an intrinsic component of his personal makeup.
- D) Pride were an intrinsic component of his personal makeup.

15.

- A) The government introduced tax laws which gave incentives to factory workers to reduce pollution.
- B) The government introduced tax laws who gave incentives to factory workers to reduce pollution.
- C) The government introduced tax laws which have incentives to factory workers to reduce pollution.
- D) The government introduced tax laws which has incentives to factory workers to reduce pollution.

16.

11. A) It was cold and foggy and he dared not to go out  
 B) It was cold and foggy and he dared not to go out  
 C) It was cold and foggy, and he dared not go out  
 D) It was cold and foggy, and he dared not going out

17.

- A) There was much cheering and singing and a bread fighting across the dining hall  
 B) There was much cheering and singing and a bread fight across the dining hall  
 C) There was more cheer and singing and a bread fighting across the dining hall  
 D) There was much cheer and singing and a bread fighting across the dining hall

18.

- 11.A | 12.C | 13.B | 14.A | 15.A

2013

11.

- A) We should pay maximum accolade for our national heroes  
 B) We should pay maximum accolade in our national heroes.  
 C) We should pay maximum accolade to our national heroes  
 D) We should pay maximum accolade from our national heroes

12.

- A) Does any body knows why the latitudes close to the equator are called the horse latitude?  
 B) Do any body knows why the latitudes close to the equator are called the horse latitude?  
 C) Does any body knows why the latitudes close to the equator are called the horse latitude?  
 D) Does any body know why the latitudes close to the equator are called the horse latitude?

13.

- A) Shelly is consider to be an idealist poet.  
 B) Shelly is considering to be an idealist poet.  
 C) Shelly is considers to be an idealist poet  
 D) Shelly is considered to be an idealist poet

14.

- A) Pakistan cricket team forged an impregnable lead  
 B) Pakistan cricket team forged the impregnable lead.  
 C) Pakistan cricket team forged against impregnable lead.  
 D) Pakistan cricket team forged on impregnable lead.

15.

- A) A person which job involves calculating insurance risks and payments for insurance companies by studying how frequently fires, accidents, death etc. happen is called an actuary.

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A) No one is casting aspersions to you

NMDCAT in my Pocket (Our YouTube Channel)

- A) Both parents of Jameel were then long died  
 B) Both parents of Jameel were then long died  
 C) Both parents of Jameel were by long died  
 D) Both parents of Jameel were by long died

19.

- A) But the men ate their supper with good appetite  
 B) But the men ate their supper in good appetite  
 C) But the men ate their supper for good appetite  
 D) But the men ate their supper into good appetite

20.

- A) The boy was afraid of going to jail  
 A) The boy was afraid off going to jail.  
 A) The boy was afraid on going to jail.  
 A) The boy was afraid by going to jail.

- 16.C | 17.B | 18.C | 19.A | 20.A

11.

- B) A person who job involves calculating insurance and payments for insurance companies by studying how frequently fires, accidents, death etc. happen is called an actuary.

- C) A person whose job involves calculating insurance and payments for insurance companies by studying how frequently fires, accidents, death etc. happen is called an actuary

- D) A person whose job involves calculating insurance risks and payments for insurance companies by studying how frequently fires, accidents, death etc. happen is called an actuary

16.

- A) His addled brain refused to think clearly and solve a problem  
 B) His addle brain refused to think clearly and solve a problem  
 C) His addle brain refuse to think clearly and solve a problem  
 D) His addled brain refused to think clearly and solve a problem.

17.

- A) The children had bloomed while their stay on the farm  
 B) The children had bloomed during their stay on the farm  
 C) The children had bloomed on their stay on the farm  
 D) The children was bloomed while their stay on the farm

18.

- A) I should had business acumen  
 B) I should have business acumen  
 C) I should has business acumen.  
 D) I should may business acumen.

19.

A) No one is casting aspersions to you

NMDCAT in my Pocket (Our YouTube Channel)

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1. She is casting aspersions at you.  
2. She is casting aspersions on you.  
3. She is casting aspersions with you.

12.D 13.D 14.A 15.C

16.B 17.B 18.B 19.C 20.B

2012

1. The Gates remained true to her husband?  
2. The Gates remain true to her husband?  
3. The Gates remain true to her husband?  
4. The Gates remain true to her husband?

1. I longed desperately in for a tricycle.  
2. I longed desperately to a tricycle.  
3. I longed desperately for a tricycle.  
4. I longed desperately at a tricycle.

1. She felt unreal to the voice informed her of the subway.  
2. She felt unreal as the voice informed her of the subway.  
3. She felt unreal that the voice informed her of the subway.  
4. She felt unreal for the voice informed her of the subway.

1. Bill Gates is one of the wealthiest person in the world.  
2. Bill Gates is one of the wealthy person in the world.  
3. Bill Gates is one of the wealthiest persons in the world.  
4. Bill Gates is one of the wealthy person in the world.

1. Her father is a SP in the Punjab Police.  
2. Her father was a SP in the Punjab Police.  
3. Her father is an SP in the Punjab Police.  
4. Her father are a SP in the Punjab Police.

2011

1. The government should accrue taxes for strength the country.  
2. The government should accrue taxes in strength the country.  
3. The government should accrue taxes to strength the country.  
4. The government should accrue taxes by strength the country.

17. A) There were musical instruments in the shop.  
B) There was musical instruments in the shop.  
C) There has musical instruments in the shop.  
D) There is musical instruments in the shop.

18. A) He died for heart attack in 1982.  
B) He died with heart attack in 1982.  
C) He died in heart attack in 1982.  
D) He died of heart attack in 1982.

19. A) Always speak in the truth.  
B) Always tell for the truth.  
C) Always tell the truth.  
D) Always telling truth.

20. A) Hand up the answer sheet to me.  
B) Hand over the answer sheet to me.  
C) Hand down the answer sheet to me.  
D) Hand for the answer sheet to me.

21. A) Are you noticed the peach blossoms?  
B) Have you noticed the peach blossoms?  
C) Will you noticed the peach blossoms?  
D) Were you noticed the peach blossoms?

11.B 12.C 13.B 14.C 15.C 16.A 17.D  
18.C 19.B 20.B

22. A) Foreign trade have assumed greater importance in recent years.  
B) Foreign trade is assumed greater importance in recent years.  
C) Foreign trade has assumed greater importance in recent years.  
D) Foreign trade shall assumed greater importance in recent years.





19. I could barely make out the traffic sings because of the

20. I could barely make up the traffic sings through the

21. I asked as though he is lame

22. I asked as though he was lame

23. I asked as though he were lame

24. I asked as though he may have been lame.

25. I asked as though he may have been lame.

26. I asked as though he may have been lame.

27. I asked as though he may have been lame.

28. I asked as though he may have been lame.

29. I asked as though he may have been lame.

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91. I asked as though he may have been lame.

92. I asked as though he may have been lame.

93. I asked as though he may have been lame.

94. I asked as though he may have been lame.

95. I asked as though he may have been lame.

96. I asked as though he may have been lame.

97. I asked as though he may have been lame.

98. I asked as though he may have been lame.

99. I asked as though he may have been lame.

100. I asked as though he may have been lame.

2009

Part III

1. Read the following questions, four alternative sentences are given. Choose the CORRECT one and fill the circle next to that letter in the MCQ Response form.

1. E-mail is a relatively new mean of communication.  
A) E-mail is a relatively new mean of communication.  
B) E-mail is a relatively new mean of communication.  
C) E-mail is a relatively new means of communication.  
D) E-mail is a relatively new means of communication.

2. As she said the computer was programed by Mona.  
A) As she said the computer was programed by Mona.  
B) As she said the computer was programed by Mona.  
C) As she said the computer was programed by Mona.  
D) As she said the computer was programed by Mona.

3. The remains of the body were thrown into the sea.  
A) The remains of the body were thrown into the sea.  
B) The remains of the body were thrown into the sea.  
C) The remains of the body were thrown into the sea.  
D) The remains of the body were thrown into the sea.

4. We will discuss you problem as soon as the committee  
A) We will discuss you problem as soon as the committee  
B) We will discuss you problem as soon as the committee  
C) We will discuss you problem as soon as the committee  
D) We will discuss you problem as soon as the committee

5. Leaving for the book, the ladder slipped out from  
A) Leaving for the book, the ladder slipped out from  
B) Leaving for the book, the ladder slipped out from him.  
C) When he reached for the book, the ladder was slipped  
D) When he was trying to reach for the book, the ladder  
slipped out from under him.

6. After the sun has been set behind the mountain, a cool  
breeze sprang up and brought relief from the heat.  
A) After the sun had set behind the mountain, a cool breeze  
sprang up and brought relief from the heat.  
B) After the sun would set behind the mountain, a cool  
breeze sprang up and brought relief from the heat.  
C) After the sun set behind the mountain, a cool breeze  
sprang up and brought relief from the heat.  
D) After the sun set behind the mountain, a cool breeze  
sprang up and brought relief from the heat.

7. Masood told me that he would hire more salesman if he  
is in my position.  
A) Masood told me that he would hire more salesman if he  
has been in my position.  
B) Masood told me that he would hire more salesman if he  
has my position.  
C) Masood told me that he would hire more salesman if he  
had been in my position.  
D) Masood told me that he would hire more salesman if he  
had been in my position.

8. He consumed his heart on this and washed away before  
the very eyes of the people.  
A) He consumed his heart on this and washed away before  
the very eyes of the people.  
B) He consumed his heart at this and washed away before  
the very eyes of the people.  
C) He consumed his heart for this and washed away before  
the very eyes of the people.  
D) He consumed his heart over this and washed away  
before the very eyes of the people.

9. They felt bad while leaving their friends.  
A) They felt badly about leaving their friends.  
B) They felt very badly about leaving their friends.  
C) They felt badly while leaving their friends.  
D) They felt badly while leaving their friends.

- A) He then struck the man himself a similar bow, which felled him on the earth like a log.  
 B) He then struck the man himself a similar bow, which felled him over the earth like a log.  
 C) He then struck the man himself a similar bow, which felled him to the earth like a log.

D) He then struck the man himself a similar bow, which felled him in the earth like a log

11.C 12.A 13.A 14.D 15.D 16.D 17.D

18.D 19.A 20.C

2008

11. A) He lacked both the training and equipment needed in the job.  
 B) He lacked both the training and equipment needed by the job.  
 C) He lacked both the training and equipment needed on the job.  
 D) He lacked both the training and equipment needed for the job.

12.

- A) They tried to pacify him for kindness and affection.  
 B) They tried to pacify him in kindness and affection.  
 C) They tried to pacify him by kindness and affection.  
 D) They tried to pacify him with kindness and affection.

13.

- A) Then he sat down in corner and remained quiet.  
 B) Then he sat down in corner and remained quiet.  
 C) Then he sat down in corner and remain quiet.  
 D) Then he sat down in corner and remained quiet.

14)

- A) He was drenched with the hotness of his fear.  
 B) He was drenched in the hotness of his fear.  
 C) He was drenched by the hotness of his fear.  
 D) He was drenched of the hotness of his fear

15)

- A) Why did you disagree with me?  
 B) Why did you disagree to me?  
 C) Why did you disagree on me?  
 D) Why did you disagree by me?

16)

## Chapter 4 (Vocabulary)

In each of the following questions, four alternative meanings of a word are given. You have to select the NEAREST (CORRECT) MEANING of the given word and fill the appropriate Circle on the MCQ Response Form.

2019

2018

21) Illatus

- A) Lull  
 C) Heretical

- B) Veneration  
 D) Longing

ACA & Ali Series  
 22) Nexus  
 A) Success  
 C) Politics  
 D) ilk  
 A) Culture  
 C) Breed  
 D) Penumbra  
 A) Clear  
 C) Spacious  
 D) Duncie  
 A) Brainy  
 C) Cautious  
 D) Hector  
 A) Hectic  
 C) He pinate  
 D) Lamppost

21) MOTIF

- A) Toigh  
 C) Moton  
 D) INQUITY  
 A) Inequality  
 C) Wickedness

23) EFFULGENCE

- A) L seless  
 C) Daimless

24) MOSAIC

- A) Pattern  
 C) Ordinary

25) INSCRUTABLE

- A) Immoral  
 C) Enigmatic

26) JUSTIFY

- A) Justify  
 C) Expose

21) CENTENARY

- A) A hundredth anniversary  
 B) Relating to cent  
 C) Relating to sin  
 D) Relating to cent

22) CORRELATE

- A) Demon  
 B) Cockerel

23) COCCYX

- A) Drug  
 B) Furce

24) COMPLACENT

- 165 | Page



B) Hinterland  
D) Focal point

B) Origin  
D) Civilization

B) Strained  
D) Convenient

B) Oaf  
D) Intellectual

B) Harass  
D) Hellish

ampoon

2017 Reconduct

21) MOTH

B) Stuff  
D) Design

22) INQUITY

B) Injustice  
D) Efficiency

23) FECKLESS

B) Careless  
D) Fearless

24) MOSAIC

B) Mortal  
D) Musical

25) INSCRUTABLE

B) Unethical  
D) Unaccountable

26) JUVENILE

B) Compare  
D) Jetison

2017

27) ANTENNAL

C) convention  
D) Stone

28) ORBIT

C) Bone  
D) Shield

29) COMPLACENT

C) convention  
D) Stone

30) COMPLACENT

C) Bone  
D) Shield

A) Baroque  
C) Appreciate  
28) Perpetuate  
A) Skalk  
C) Perish  
29) August  
A) Old  
C) Foreign  
30) Buffers  
A) Window  
C) Shield  
21.A 22.D 23.C 24.B 25.B 26.B 27.A  
28.D 29.D 30.C

27) LACERATING

A) Tearing  
B) Landing  
C) Flagging  
D) Lactating

28) EMPATHY

A) Facility  
B) Fictitious  
C) Ability  
D) Felicity

29) EVANESCENT

A) Permanent  
B) Evident  
C) Event  
D) Transitory

30) MUSE

A) Wander  
B) Fonder  
C) Robust  
D) Ponder

21.D 22.C 23.A 24.A 25.C 26.B 27.B

28.C 29.D 30.D

A) Self-regarding

B) Self-concent

C) Talented

D) Self-control

25) ACCESSORY

A) Fading

B) Unabated

26) AFFINITY

A) Coenobium

B) Nebulous

27) BOURGEOIS

C) Mallock

D) Intrepidity

C) Prosperity

D) Nugatory

- 28) **ADMINISTRATION**  
 A) Publicity  
 B) Juvenility  
 C) Belonging to the lower class  
 D) Belonging to the middle class

- 29) **AUDACIOUS**  
 A) Oozy  
 B) Perl  
 C) Acquisition  
 D) Bussing

## 2016

- 30) **BOI QUET**  
 A) Pylogenema  
 B) Poss  
 C) Netropsy  
 D) Dampier

## 2015

- 21) **STALWART**  
 A) Loyal  
 B) lazy  
 C) Lacking strength  
 D) High

22) **CHIVALRY**

- A) Coward  
 B) Non-cooperative  
 C) Imitating  
 D) Gallant

23) **RAKISH**

- A) Curved  
 B) Traditional  
 C) Formal  
 D) Dashing

24) **PRODIGIOUS**

- A) Huge  
 B) Little  
 C) Teeter  
 D) Squat

25) **IMPROVISE**

- A) Colophon  
 B) Divert  
 C) Cussoc  
 D) Respite

26) **PARADOX**

- A) Anomaly  
 C) Steward

2014

21) **EMPATHY**

- A) Understanding  
 B) A amonity  
 C) Empathy  
 D) Sympathy

22) **EFFICACY**

- A) Effectiveness  
 B) Success  
 C) Application  
 D) Reluctance

23) **ENCLAVE**

- A) Island  
 B) Coast  
 C) Strategic  
 D) Opposite

24) **IRREFRIGENT**

- A) Progressive  
 B) Harmful  
 C) Irrefragable  
 D) Positive

25) **RAPT**

- A) Trumpet  
 B) Bewitched  
 C) Rapt  
 D) Ash

26) **PEDAGOGY**

- A) Teaching  
 B) Learning  
 C) Education  
 D) Pedagogy

2013

- ACA & All Series  
 21) **MISDAIN**  
 A) Vice  
 B) Dislike  
 C) Suspicious  
 D) Cruelty  
 22) **FILIALITY**  
 A) Sonnet  
 B) Dance  
 C) Rhyme  
 D) Sonnet  
 23) **DIASPORA**  
 A) Gathering  
 B) Dispersion  
 C) 21.C  
 D) 22.C

20) **HEINOUS**

- A) Heroic  
 B) Humorous  
 C) Ill-fated  
 D) Intimate

21) **LICENTIOUS**

- A) Motif  
 B) Tough  
 C) Soft  
 D) Inculcate

22) **INCLUCAT**

- A) Acculate  
 B) Instill  
 C) Inequity  
 D) Inequality

23) **MOTIF**

- A) Tough  
 B) Soft  
 C) 21.C  
 D) 22.C

20) **DISSONANCE**

- A) Inconsistency  
 B) Expansion  
 C) Trifle  
 D) Padding

21) **TRIFLE**

- A) Padding  
 B) Blot  
 C) Murky  
 D) Sisy

22) **MURKY**

- A) Squeaky  
 B) Fat X  
 C) Bender  
 D) Muteke

23) **MYRIAD**

- A) Countable  
 B) Uncountable  
 C) 167  
 D) Page

NUMS and National MDCAT by Ali	
26) IMPETUOUS	A) Honest B) Impulsive
27) VIOLENT	A) Hidden B) Loud
28) TRANSIENT	A) Permanent B) Temporary
29) PROWESS	A) Humance B) Skill
30) BEQUEATH	A) Grant B) Imbibe
31) CONTEMPT	A) Ignorance
32) IGNORANCE	A) Wisdom B) Foolishness
33) WISDOM	A) Show off B) Preserve
34) FOOLISHNESS	A) Bad B) Dishonest
35) BAD	A) Alliance B) Animosity
36) DISHONEST	A) Alliance B) Animosity
37) ALLIANCE	A) Alliance B) Animosity
38) ANIMOSITY	A) Alliance B) Animosity
39) ALLIANCE	A) Alliance B) Animosity
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97) ALLIANCE	A) Alliance B) Animosity
98) ANIMOSITY	A) Alliance B) Animosity
99) ALLIANCE	A) Alliance B) Animosity
100) ANIMOSITY	A) Alliance B) Animosity

21) HEINOUS	22) B	23) D	24) B	25) C	26) B	27) D	28) D	29) C	30) C
A) Atrocious									
B) Heinous									
22) ILLECT									
A) Estimate									
B) Licentious									
23) MOTIF									
A) Subject									
B) Motif									
24) INCULCATE									
A) Incubate									
B) Inculcate									
25) INMITY									
A) Inimicity									
B) Inimice									
26) INTRANSIGENT									
A) Parallel									
B) Inflexible									
27) LAVIPOON									
A) Lark									
B) Gratification									
28) MESMERIZE									
A) Objectify									
B) Modify									
29) OBLITERATE									
A) Sanctify									
B) Obscure									
30) MALEVOLENCE									
A) Empathy									
B) Malicious									
C) Wickedness									
D) Efficiency									
C) Odious									
D) Hone									
C) Illegal									
D) Limits									
C) Motion									
D) Design									
C) Instigate									
D) Stimulate									
C) Annihilate									
D) Oplate									
C) Hostility									
D) Management									

B) Multitude	D) Blurred
<b>26) FACILE</b>	C) Delicate
A) Fallacy	D) Superficial
B) Depict	
<b>27) MAGNUM</b>	C) Modest
A) Masterpiece	D) Magnetic
B) Magnanimity	
<b>28) SIFTLE</b>	C) Siege
A) Sneak	D) Sieve
B) Sift	
<b>29) PLETHORA</b>	C) Measure
A) Plastic	D) Malleable
B) Super fluidity	
<b>30) VERIFI-</b>	



A) Poetry	C) Zenith					
B) Depth	D) Diminish					
21.A	22.A	23.D	24.D	25.B	26.D	27.A

## Part IV

In each of the following questions, four alternative meanings of a word are given. You have to select the NEAREST CORRECT MEANING of the given word and fill the appropriate Circle on the MCQ Response Form.

Form.

2011

## 21) MUSE

- A) Wander  
B) Fonder

## 22) FECKLESS

- A) Useless  
B) Careless

## 23) MOSAIC

- A) Pattern  
B) Mortal

## 24) INSRUTABLE

- A) Immoral  
B) Unethical

## 25) JUNCTAPOSE

- A) Justify  
B) Compare

## 26) LACERATING

- A) Landing  
C) Flagging

## 27) EMPATHY

- A) Fictitious  
C) Ability  
D) Felicity

## 28) EVANESCENT

- A) Evident  
C) Event

## 29) SIDLE

- A) Sneak  
C) Sledge  
D) Sieve

## 30) DISSONANCE

- A) Inconsistency  
B) Expansion  
C) Perceptible  
D) Wrap Part

21.D 22.A 23.A 24.C 25.B 26.B 27.C

28.D	29.A	30.A				
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2010

## 21) WALLOW

- A) Roll about  
B) Mock

## 22) CONNOISSEUR

- A) Guide  
B) Artist

## 23) ECCENTRIC

- A) Lunatic  
B) Stern

## 24) BOULDER

- A) Rounded stonehill  
C) Magnanimity

## 25) SLUMBER

- A) Ilesp  
B) Humble

## 26) EXCREMENT

- C) Knee  
D) Sleep

- A) Increment  
C) Excitement  
D) Disagreement

- B) Waste water expelled from body

- D) Disagreement

## 27) VISAGE

- A) Vision  
C) Trunkless  
D) A person's face

## 28) FELICITY

- A) Intense happiness  
C) Inspire

## 29) ENMESHED

- A) Sojourn  
B) Entangles

## 30) CAPTIVATE

- A) Hesitate  
B) Concentrate  
C) Hate  
D) Fascinate

21.A	22.C	23.D	24.B	25.D	26.B	27.D	28.A	29.B	30.D
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**OPPOST**

- A) Critical  
B) Reluctant

- C) Happy  
D) Horrified

**OPVIOUS**

- A) Unbreakable  
B) Interesting

- C) Unpleasant  
D) Fun

**OPROMPT**

- A) Arrive at the right time  
B) Showing signs of being good  
C) Done without preparation  
D) Watched

**OPSCREMENT**

- A) A system of controlling a country  
B) The ability to show good judgment  
C) The act of encouraging somebody  
D) The ability to show no concern

**OPNEOLGISM**

- A) A new word  
C) Brief summary

21.D 22.C 23.C 24.B 25.A

26) FURTIVE. B) Pleasant remarks D) Archive expression  
A) Famous B) Familiar  
C) Secretive D) Easy

**27) BOURGEOIS**

- A) Belonging to the bureaucratic class  
B) Belonging to the middle class  
C) Belonging to upper class  
D) Belonging to the lower class

**28) RUMINATE**

- A) Eat greedily C) Work lazily  
B) Think deeply D) Run fast

**29) EMBELLISH**

- A) Beautify C) Finish  
B) Nominate D) Suitable

**30) PARABLE**

- A) Impossible C) Allegory  
B) Suitable D) Suitable

**OPVEING**

- A) Annoying  
B) Aggressive

- C) Viable  
D) Waxy

**OPVAGLE**

- A) Respectful  
B) Uncertain

- C) Warlock  
D) Snow white

**OPVANGLED**

- A) Dodged  
B) Indisputable

- C) Grained  
D) Damaged

**OPRODIGIOUS**

- A) Productive  
B) Famous

- C) Prudential  
D) Waddle

**OPVSTOUNDED**

- A) Shocked  
B) Assured

- C) Discarded  
D) Attracted

**OPVAGACITY**

- A) Shocked  
B) Assured

- C) Discarded  
D) Attracted

21.A 22.B 23.D 24.B 25.A 26.D 27.C 28.A 29.B 30.C

- A) Foolishness B) Onions  
B) Larger city D) Wisdom

**27) GRIM**

- A) Gratis C) Severe  
B) Restless D) Grater

**28) INDOLENTLY**

- A) Lazily C) Ideally  
B) Indecently D) Gaily

**29) PERISH**

- A) Furious C) Secret  
B) Come to death D) Frustrated

**30) DOZE**

- A) Dozed C) Sleep  
B) Diet D) Medicine to be taken

## MDCAT Chemistry Past paper

## Unit 1 Fundamental Concepts

## Relative atomic mass

1. While finding the relative atomic mass, which of the following standard is used to compare the atomic mass of chlorine (35.5amu) [2018]

A) Neon-20  
C) Nucleon number  
B) Carbon-13  
D) Carbon-12

2. Hydrogen burns in chlorine to produce hydrogen chloride. The ratio of masses of reactants in chemical reaction



A) 2:35.5  
C) 1:35.5  
B) 1:1  
D) 2:70 [2013]

## Mass spectrometer

3. The average atomic mass of Boron is 10.8. It has two isotopes of masses 10 and 11 respectively. What is the percentage of isotope with the average mass of 10? [2019]

A) 20%  
C) 60%  
B) 80%  
D) 80%

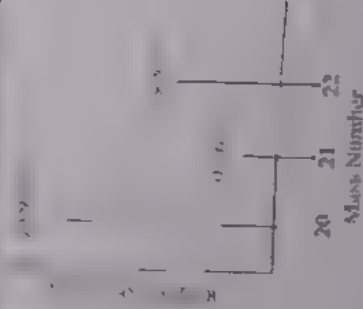
4. The substance for the separation of isotopes is firstly converted into the:

A) Neutral state  
C) Vapour state  
B) Free state  
D) Charged state [2016]

5. With the help of spectral data given calculate the mass of Neon and encircle the best option (percentage of  $^{20}\text{Ne}$  and  $^{22}\text{Ne}$  are 90.92%, 0.26% and 8.82% respectively) [2015]

A) 22.18 amu  
C) 20.8 amu  
B) 21.18 amu  
D) 22.20 amu

6. A sample of Neon is found to exist as  $^{20}\text{Ne}$ ,  $^{21}\text{Ne}$ . Mass spectrum of  $^{20}\text{Ne}$  is as follows:



What is the relative atomic mass ( $A_r$ ) of Neon?

A) 20.18  
C) 20.10  
B) 20.28  
D) 20.22

7. During isotopic analysis, the pressure of vapour of ion maintained in ionization chamber of mass spectrometer is

A) Around  $10^{-7}$  torr  
C) 1 torr  
B) Around  $10^{-6}$  torr  
D)  $10^{-7}$  torr [2006]

## Empirical and Molecular formula

8. The formula which shows the simplest whole number ratio for the atoms of different elements in a compound

A) Ionic formula  
C) Empirical formula  
B) Structural formula  
D) Molecular formula [2016]

9. An organic sample consisting of carbon, hydrogen and oxygen was subjected to combustion analysis. 0.5439 g of this compound gave 1.039g carbon dioxide, 0.6369g of water vapors. The empirical formula of this compound is:

A)  $\text{CH}_3\text{O}$   
C)  $\text{CH}_2\text{O}$   
B)  $\text{C}_4\text{H}_5\text{S}_2\text{O}$   
D)  $\text{CH}_2\text{O}$  [2017]

10. A compound has an empirical formula  $\text{CH}_2\text{Cl}$ . Its molecular formula mass is 99  $\text{g mol}^{-1}$ , identify the compound:

A)  $\text{C}_2\text{H}_4\text{Cl}_2$   
C)  $\text{C}_4\text{H}_8\text{Cl}_4$   
B)  $\text{C}_4\text{H}_6\text{Cl}_2$   
D)  $\text{C}_2\text{H}_4\text{Cl}$  [2017-Retake]

11. Polymer of simplest formula  $\text{CH}_2$  has molar mass of 28000  $\text{g mol}^{-1}$ . Its molecular formula is

A) 100 times that of its empirical formula  
B) 500 times of its empirical formula  
C) 200 times that of its empirical formula  
D) 2000 times that of its empirical formula [2014]

12. An organic compound has empirical formula  $\text{C}_4\text{H}_8\text{O}$  if molar mass of the compound is 116. Its molecular formula of this organic compound is  $\text{C}_8\text{H}_{16}\text{O}_2$ .  $\text{H} = 1$  and  $\text{O} = 16$

A)  $\text{C}_4\text{H}_8\text{O}$   
B)  $\text{C}_8\text{H}_{16}\text{O}_2$  [2015]

13. How many moles of  $\text{C}$  are in 1.75 kg of  $\text{C}$ ?

A) 0.0175 mol  
C) 17.5 mol  
B) 0.0175 mol  
D) 17.5 mol

14. The number of moles of  $\text{C}$  in 1.75 kg of  $\text{C}$  is

A) 100 moles  
C) 50 moles  
B) 100 moles  
D) 50 moles

A) 105 gm  
C) 80 gm

16. There are \_\_\_\_\_ Pakistan. If each Pakistani has \_\_\_\_\_ many moles of  $\text{C}$  in 1.75 kg of  $\text{C}$ ?

A)  $6.67 \times 10^{-7}$   
C)  $6.67 \times 10^{-7}$   
B)  $6.67 \times 10^{-7}$   
D)  $6.67 \times 10^{-7}$

A) 4g of  $\text{O}$   
C) 4g of  $\text{O}$

18. Determine the molar mass of  $\text{Na}_2\text{CO}_3$ .

A) 0.4 mole  
C) 0.2 mole  
B) 0.4 mole  
D) 0.2 mole

19. Choose the correct number of particles in 1 mole of  $\text{C}$ .

A) 0.75  
C) 0.25  
B) 0.75  
D) 0.25

21. How many moles of  $\text{C}$  are in 1.75 kg of  $\text{C}$ ?

A) 0.75  
C) 0.25  
B) 0.75  
D) 0.25



**Mole**

100 Many moles of calcium carbonate are present in 1.75 kg of calcium carbonate? (Ar of C = 12, Ar of O = 16)

A) 0.0175 mol [2019]

B) 1.75 mol

C) 1.75 mol

D) 1750 mol

11 The number of moles of water in 1 Kg of ice are

A) 100 moles [2019]

B) 1000 moles

C) 50 moles

D) 55.5 moles

12 A mole of calcium will contained of calcium:

A) 10<sup>23</sup>gm [2018]

B) 100gm

C) 120gm

13 There are almost 200 million people alive in Pakistan. If you were to distribute rupees 100 to each Pakistani in the form of 5-rupee coin, how many moles of coins you must have?

A)  $6.67 \times 10^{-4}$  [2017]

B)  $1.5 \times 10^{-14}$

C)  $6.67 \times 10^{-4}$

D)  $1.5 \times 10^{-14}$

14 Which one of the following has same number of molecules as present in 11g of  $CO_2$ ?

A) 4g of  $O_2$  [2017]

B) 4.5g of  $H_2O$

C) 4g of  $O$

D)  $1/4$  moles of NaCl

15 Determine the number of moles of O in 10.6g of  $Na_2CO_3$ :

A) 0.4 moles [2017]

B) 0.3 moles

C) 0.2 moles

D) None of these

16 Choose the correct option regarding number of particles associated with one mole of a substance:

A)  $6.02 \times 10^{23}$  [2017-Retake]

B)  $6.01 \times 10^{19}$

C)  $6.02 \times 10^{23}$

D)  $6.02 \times 10^{23}$

17 The number of moles of  $CO_2$  which contain

8.0g of oxygen is:

A) 0.2 [2016]

B) 1.50

C) 1.00

18 How many moles of sodium are present in 0.1g of sodium?

A)  $4.3 \times 10^{-1}$  [2015]

B)  $4.03 \times 10^{-1}$

C)  $4.3 \times 10^{-1}$

19 The number of molecules in 9g of ice ( $H_2O$ ) is

A)  $4.3 \times 10^{-1}$  [2014]

B)  $4.3 \times 10^{-1}$

C)  $4.3 \times 10^{-1}$

D)  $4.3 \times 10^{-1}$

- A)  $6.02 \times 10^{23}$   
B)  $3.01 \times 10^{23}$   
C)  $6.02 \times 10^{23}$   
D)  $3.01 \times 10^{23}$

23. One mole of any gas at STP occupies a volume of:

- A) 22.4 l/dm<sup>3</sup> [2010]  
B) 22.4 l/dm<sup>3</sup>  
C) 23.4 l/dm<sup>3</sup>  
D) 20.4 l/dm<sup>3</sup>

24. 36 g of HCl dissolves in 100g of solution. The density of HCl is 1.19g/cm<sup>3</sup>. What will be the molar mass of HCl?

- A) 36.5 g/mol [2009]  
B) 100 g/mol  
C) 35.5g/mol  
D) 36 g/mol

**Stoichiometry**

25. During stoichiometric calculations, which of the following laws must be followed?

[2019]

- A) Dalton's law  
B) Law of conservation of mass  
C) Avogadro's law  
D) Law of conservation of energy

26. Calculate the gram of  $H_2O$  formed when 8g of  $CH_4$  burns in excess of oxygen.

[2017]

- A) 21 gram  
B) 19 grams  
C) 18 grams  
D) 15 grams

27. If we know the mass of one substance, we can calculate the volume of other substance vice versa with the help of chemical equation is called:

[2010]

- A) Mass-mass relationship  
B) Mass-mole relationship  
C) Mass-volume relationship  
D) Mole-volume relationship

**Limiting Reactant**

28. When 8 grams (4 moles) of  $H_2$  react with 2 moles of  $O_2$ , how many moles of water will formed

[2012]

- A) Five  
B) Four  
C) Six  
D) Three

29. A limiting reactant is the one which:

[2009]

A) Is mostly a cheaper substance and taken in larger quantity?

B) Is consumed earlier and controls the amount of product formed in a chemical reaction

C) Gives greatest number of moles of products

D) Is left behind after the completion of reaction

30. Ten moles of hydrogen are allowed to react with 6 moles of oxygen. How much water obtain on

complete consumption of one gas?

[2008]

- A) 10 moles  
B) 8 moles  
C) 6 moles  
D) 4 moles

Yield

31. A researcher has prepared a sample of 1-Bromopropane from 10g of 1-propanol. After purification he had made 12g of product. Which of the following is percentage yield?

[2017]

- A) 60%  
B) 58%  
C) 90%  
D) 50%

Molarity

32. Solution contains 85.5 g of sucrose ( $C_{12}H_{22}O_{11}$ ) in 250  $cm^3$ . What is the molarity?

[2019]

- A) 0.5 M  
B) 2M  
C) 0.25 M  
D) 1 M

33. What mass of NaOH is present in 0.5mol of sodium hydroxide?

[2016]

- A) 40gm  
B) 2.5gm  
C) 15gm  
D) 20gm

34. 10.0 grams of glucose are dissolved in water to make 100  $cm^3$  of its solution, its molarity is

[2015]

- A) 0.55  
B) 1.0  
C) 10  
D) 1

35. 36 g of HCl dissolves in 100 g of solution. The density of HCl is 1.19  $gcm^{-3}$ . The molar mass of the HCl solution will be:

[2009]

- A) 36.5 g/mol  
B) 100 g/mol  
C) 38.0 g/mol  
D) 11.73 g/mol

Mole Fraction

36. Given solution contains 16.0 g of  $C_2H_5OH$  92.0g of  $C_2H_5OH$  and 36g of water. Which statement about mole fraction of the components is true?

[2015]

- A) Mole fraction of  $C_2H_5OH$  is highest among all components  
B) Mole fraction of  $C_2H_5OH$  and  $H_2O$  is the same  
C) Mole fraction of  $C_2H_5OH$  and  $C_2H_5OH$  is the same  
D) Mole fraction of  $H_2O$  is the lowest among all

## Key &amp; Hints

## Unit 1 A



$$\frac{2 \times 1}{2 \times 71} = \frac{73}{100}$$

$$\frac{1}{1} = \frac{35}{100}$$

3. A: Hint: Average atomic mass of B = 10.8

$$\frac{10x + 11(100-x)}{100}$$

$$\frac{10x + 1100 - 11x}{100} = 10.8$$

$$\frac{10x + 1100 - 11x}{100} = 10.8$$

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$$\frac{10x + 1100 - 11x}{100} = 10.8$$

## NOMS and National MDCAT by Ali Sudais

Hint: F F  $\text{C}_2\text{H}_6\text{O}$

Molar Mass 110.15 g/mol

M.F. =

F.F. mass of C 11.0 (12) + (1)3 + 16

F.F. mass 55

M.F. mass  $n \times \text{F.F. mass}$

110  $n \times 55$

2  $= n$

M.F.  $= n \times \text{E.F.}$

$= 2 \times 110$

M.F.  $= \text{C}_2\text{H}_6\text{O}_2$

13. C: Hint: Mass of  $\text{CaCO}_3 = 17.5 \text{ Kg}$

$= 17.5 \times 1000 = 1750 \text{ g}$

Moles of  $\text{CaCO}_3 = \frac{1750}{100}$

$= 17.5 \text{ moles}$

14. D: Hint: Mass of water = 1 Kg = 1000 g

Moles of water =  $\frac{1000}{18}$

$= 55.5 \text{ moles}$

15. D: Hint: Moles of Ca = 3

Mass of 3 moles of Ca =  $3 \times 40$

$= 120 \text{ g}$

16. A

17. B: Hint:  $n_{\text{con}} = \frac{11}{14} = 0.25 \text{ moles}$

$\frac{4.5}{18} = 0.25 \text{ moles}$

$\text{CO}_2$  and  $\text{H}_2\text{O}$  both are molecular substance and

contain same moles.

18. B: Hint: Mass of  $\text{Na}_2\text{CO}_3 = 10.6 \text{ g}$

Moles of  $\text{Na}_2\text{CO}_3 = \frac{10.6}{106} = 0.1 \text{ moles}$

Moles of oxygen =  $0.1 \times 3 = 0.3 \text{ moles}$

19. D

20. A

21. A: Hint: mass of Na = 0.1 g

Moles of Na =  $\frac{0.1}{23}$

22. D: Hint: Mass of  $\text{H}_2\text{O} = 9 \text{ g}$

$n_{\text{H}_2\text{O}} = \frac{9}{18} = \frac{1}{2} \text{ mole}$

$n_{\text{H}_2\text{O}} = \frac{1}{2} \times 6.02 \times 10^{23}$

$n_{\text{H}_2\text{O}} = 3.01 \times 10^{23}$

23. A: Hint: Molar Volume =  $22.414 \text{ dm}^3$

24. A: Hint: Molar mass of  $\text{HCl} = 36.5 \text{ g/mol}$

25. B

26. C: Hint:  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$

Mass of  $\text{CH}_4 = 8 \text{ g}$

Moles of methane =  $\frac{8}{16} = 0.5 \text{ moles}$

Moles of  $\text{H}_2\text{O} =$



$$\frac{\text{Co-eff of } H_2O}{\text{Co-eff of } H_2} \times \text{moles of } CH_4$$

$$\text{Moles of } H_2O = \frac{2}{1} \times 0.5 = 1 \text{ mole}$$

$$\text{Mass of } H_2O = 18 \text{ g}$$

27. C

28. B: Hint: Moles of Hydrogen = 4

mole Moles of Oxygen = 2 mole

Moles of water =

Moles of  $H_2O$ 

$$\frac{\text{Co-eff of } H_2O}{\text{Co-eff of } O_2} \times \text{moles of } H_2$$

$$= \frac{2}{1} \times 4$$

2

Moles of  $H_2O$  = 4 molesMoles of  $H_2O$  =

$$\frac{\text{Co-eff of } H_2O}{\text{Co-eff of } H_2} = \text{moles of } H_2$$

$$= \frac{1}{2} \times 2$$

= 4 moles

So, moles of  $H_2O$  are 4 moles

29. B

30. A: Hint: Moles of Hydrogen = 10

Mole Moles of Oxygen = 6 mole

Moles of water = ?

Moles of  $H_2O$ 

$$\frac{\text{Co-eff of } H_2}{\text{Co-eff of } O_2} \times \text{moles of } H_2$$

$$= \frac{2}{2} \times 10$$

Moles of  $H_2O$  = 10 molesMoles of  $H_2O$  =

$$\frac{\text{Co-eff of } H_2}{\text{Co-eff of } O_2} = 10 \text{ moles of } O_2$$

$$= \frac{2}{1} \times 6$$

= 12 moles

So, actual moles of  $H_2O$  are 10 moles.31. B: Hint:  $C_3H_7OH \rightarrow C_3H_7Br$ 

Mass of 1-propanol = 10 g

Mass of 1-bromo propane = 12 g

$$\text{Moles of 1-propanol} = \frac{10}{60}$$

$$= 0.166 \text{ mole}$$

Moles of 1-bromo propane =

$$\frac{\text{Co-eff of } CH_3CH_2CH_2Br}{\text{Co-eff of } CH_3CH_2CH_2OH} \times \text{moles of } CH_3CH_2CH_2OH$$

$$\text{Moles of } CH_3CH_2CH_2Br = \frac{1}{1} \times 0.16$$

$$= 0.16$$

Moles of  $CH_3CH_2CH_2Br = \frac{10}{16} \times 12$ 

$$\text{Moles of } CH_3CH_2CH_2Br = \frac{10}{16} \times 12$$

$$\% \text{age Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$$

$$= \frac{12}{20.5} \times 100$$

$$58\%$$

32. D: Hint: Molarity =

$$\frac{\text{mass}}{\text{molar mass}} \times \frac{1000}{\text{Volume of Solution in ml}}$$

$$= \frac{85.5}{342} \times \frac{1000}{250}$$

$$1M$$

$$1M$$

33. D: Hint: Mole mass  $\times$  molar mass

$$0.5 = \text{mass} \times 40$$

$$\text{Mass of } NaOH = 20 \text{ g}$$

34. A: Hint: Mass of glucose = 10 g

$$\text{Volume of solution} = 100 \text{ cm}^3$$

$$M = \frac{\text{mass of glucose}}{M \times V \text{ of solution}} \times 1000$$

$$M = \frac{10}{18 \times 100} \times 1000$$

$$M = 0.55 \text{ molar}$$

$$M = \frac{10}{18 \times 100} \times 1000$$

$$= 0.55 \text{ molar}$$

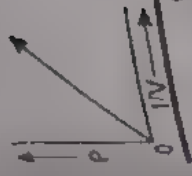
35. A

36. B: Hint: Moles of  $CH_3OH = \frac{16}{32} = 0.5 \text{ moles}$ 

$$\text{Moles of } C_2H_5OH = \frac{92}{46} = 2 \text{ moles}$$

$$\text{Moles of } H_2O = \frac{36}{18} = 2 \text{ moles}$$

$C_2H_5OH$  and  $H_2O$  consist of similar number of moles therefore, their mole fraction is also same



3. Gas is enclosed in a moving piston. What will happen to the temperature of the gas if the volume is doubled from  $20^\circ\text{C}$  to  $40^\circ\text{C}$ ?

- A) Collide lower  
B) Pressure  
C) Temperature  
D) Volume  
E) Liquid in the container  
What will happen to the temperature of the gas if the volume is doubled from  $20^\circ\text{C}$  to  $40^\circ\text{C}$ ?

- A) 300K  
C) 343K

4. 28g of  $N_2$  is

- A) 22.41 dm<sup>3</sup>  
C) 44.82 dm<sup>3</sup>

5. The number of molecules in 1 mole of gas at  $0^\circ\text{C}$  and 1 atm is

- A)  $6.02 \times 10^{23}$   
C)  $6.02 \times 10^{24}$

6. All the collisions between gas molecules are

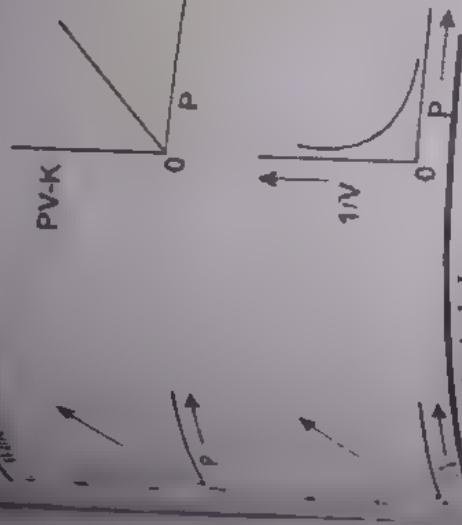
- A) No change in energy  
B) No change in momentum  
C) No change in mass  
D) No change in volume

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UNIT 2: States of matter

Boyle's law

Which graph represents Boyle's law



Charles's Law

A gas is enclosed in a container of  $20\text{ cm}^3$  with the moving piston. According to kinetic theory of gases, what will be the effect on freely moving molecules of the gas if temperature is increased from  $20^\circ\text{C}$  to  $100^\circ\text{C}$ ?

- A) Colliding capability of molecule will become lower [2018]
- B) Pressure will become one half
- C) Temperature has no effect on freely moving molecules
- D) Volume will be increased

Liquid in the container have temperature  $70^\circ\text{C}$ . What will be the temperature in Kelvin Scale?

- A)  $300\text{K}$
- B)  $350\text{K}$
- C)  $343\text{K}$
- D)  $283\text{K}$

Avogadro's Law

Vol of  $\text{N}_2$  will at STP occupy the volume of:

- A)  $22.41\text{ dm}^3$
- B)  $44.82\text{ cm}^3$
- C)  $44.82\text{ dm}^3$
- D)  $2.241\text{ dm}^3$

The number of molecules in  $22.4\text{ dm}^3$  of  $\text{H}_2$  gas at  $0^\circ\text{C}$  and  $1\text{ atm}$  are

- A)  $6.02 \times 10^{23}$
- B)  $6.02 \times 10^{23}$
- C)  $6.02 \times 10^{23}$
- D)  $6.02 \times 10^{22}$

Ideal gas equation

All the collisions between the particles of gases are elastic in nature. What is meant by "Elastic

collisions" [2019]

No change in potential energy during the collisions

NUMS and National MDCAT by Ali Sudais

- B) The velocity of the molecules changes
  - C) No change in the kinetic energy
  - D) No change in mass during the collisions
7. Which of the following is the correct equation to calculate relative molecular mass of gas : [2018]

- A)  $M = \frac{mP}{V}$
- B)  $M = \frac{PV}{mRT}$
- C)  $M = \frac{mPR}{VT}$
- D)  $M = \frac{mRT}{PV}$

8. Identify the value of R at STP; [2017]

- A)  $8.314\text{ atm dm}^3\text{ mol}^{-1}$
- B)  $0.821\text{ cal K}^{-1}\text{ mol}^{-1}$
- C)  $0.0821\text{ atm dm}^3\text{ K}^{-1}\text{ mol}^{-1}$
- D)  $8.314\text{ cal K}^{-1}\text{ mol}^{-1}$

9. The root mean square velocity of gases is inversely proportional to the square root of their: [2010]

- A) Molar mass
- B) Temperature
- C) Pressure
- D) Volume

10. Which one of the following expression represent the Avogadro law? [2010]

- A)  $V \propto \frac{Rn}{T}$  (When T and n are constant)
- B)  $V \propto \frac{Rn}{T}$  (When p and n are constant)
- C)  $V \propto \frac{Rn}{T}$  (When T and P are constant)
- D)  $V \propto \frac{RP}{nT}$  (When T, P and n are constant)

11. Absolute zero is unattainable. Current attempts have resulted in temperature as low as: [2009]

- A)  $10^{-4}\text{K}$
- B)  $10^{-2}\text{K}$
- C)  $10^{-1}\text{K}$
- D)  $10^{-3}\text{K}$

12.  $100\text{ dm}^3$  at  $3\text{ atm}$  pressure and  $27^\circ\text{C}$  is transfer to chamber of  $300\text{ dm}^3$  maintained at a temperature of  $327^\circ\text{C}$ . What will be the pressure in chamber? [2008]

- A)  $6\text{ atm}$
- B)  $4\text{ atm}$
- C)  $2\text{ atm}$
- D)  $1\text{ atm}$

Non Ideal behavior

13. In the equation  $(P + \frac{a}{V^2})(V - nb) = nRT$ , b, represents the \_\_\_\_; [2017-Retake]

- A) Excluded volume
- B) Excluded pressure
- C) Actual volume
- D) Excluded volume per mole

14. At a given temperature and pressure, the one which shows marked deviation from ideal behavior is [2014]

- A)  $\text{N}_2$
- B)  $\text{H}_2$

C) CO<sub>2</sub>

D) He

15. There are four gases H<sub>2</sub>, He, N<sub>2</sub> and CO<sub>2</sub> at 0°C.

Which gas shown greater non-ideal behavior?

[2013]

A) He

B) CO<sub>2</sub>C) H<sub>2</sub>D) N<sub>2</sub>Intermolecular Forces

16. London dispersion forces are the only forces present among the

[2016]

A) Molecules of H<sub>2</sub>O in liquid state

B) Molecules of HCl gas

C) Atoms of helium in gaseous state at high temp

D) Molecules of solid chlorine

17. The amount of heat absorbed denoted by

[2008]

A)  $\Delta H$ B)  $\Delta H$ C)  $\Delta H_v$ D)  $\Delta H_s$ 18. Boiling point of HF is \_\_\_\_\_ H<sub>2</sub>O.

[2008]

A) Lower than

B) Higher than

C) Equal to

D) almost same as

19. \_\_\_\_\_ is colorless volatile liquid at room temperature.

[2008]

A) HCl

B) HF

C) HI

D) HBr

Hydrogen Bonding

20. Which of the following substances exhibits hydrogen bonding?

[2019]

A) HI

B) H<sub>2</sub>SC) SiH<sub>4</sub>D) NH<sub>3</sub>

21. What is reason the ice at 0°C occupies more volume than water:

[2017 Retake]

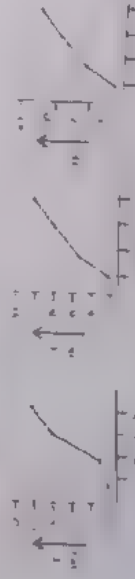
A) Empty spaces

B) Ionic bond

C) Intermolecular forces

D) Debye forces

22. Study the following graphs of boiling points of some substances:



Group VII hydrides

Which of the above graphs show that members of the graph have hydrogen bonding?

A) I + V

B) II + IV

C) III + V + VI

D) I + II + III

23. Correct order of boiling points of the given compounds is

A) H<sub>2</sub>O > HF > HCl > NH<sub>3</sub>B) HF > H<sub>2</sub>O > HCl > NH<sub>3</sub>C) H<sub>2</sub>O > HF > HCl > NH<sub>3</sub>D) HF > H<sub>2</sub>O > NH<sub>3</sub> > HClStructure of ice, NaCl, Diamond and Graphite

24. Electrical conductivity of graphite is greater in \_\_\_\_\_ direction that in other due to

A) Isomorphism

B) Cleavage plane

C) Anisotropy

D) Symmetry

25. Ice is less dense than water at

A) 0°C

B) -4°C

C) 4°C

D) 2°C

26. The coordination number of Na<sup>+</sup> in NaCl crystal is:

A) 6

B) 2

C) 4

D) 8

27. In the structure of NaCl, each Na<sup>+</sup> is surrounded by \_\_\_\_\_ V-lions.

A) Four

B) Eight

C) Five

D) Six

28. Electron gas theory was proposed to explain the bonding in \_\_\_\_\_ solids:

A) Molecular

B) Ionic

C) Covalent

D) metallic

29. The crystals of \_\_\_\_\_ are ionic solids.

A) Sugar

B) Iron

C) Diamonds

D) NaCl



by Ali Sudais  
how that some  
gen bonding?  
[2017]  
1 + 11

he given liquid

[2012]

d

greater in one

[2016]  
age place  
ectry

[2014]

NaCl crystal

[2017]

is surrounded

[2010]

o explain the

[2009]

[2008]

Key & Hints of Unit 2

1. B  
p: Hint: Volume increases with the increase with the increase of temperature
3. C  
Hint: According to the Avogadro's law  
Molar volume at STP contain  $6.02 \times 10^{23}$  molecules
4. A  
Hint: Moles of  $N_2 = 28/28 = 1$  mole  
Number of molecules =  $6.02 \times 10^{23}$
5. B
6. C
7. D
8. C
9. A: Hint:  $C_{rms} = (3RT/M)^{1/2}$
10. C: Hint:  $V = nRT/P$   
 $V \propto n$  (At constant T and P)
11. D
12. C: Hint:  $P_1 V_1/T_1 = P_2 V_2/T_2$   
 $3 \times 100/300 = P_2 \times 300/600$   
 $P_2 = 2$  atm
13. D
14. C: Hint:  $CO_2$  has larger size therefore, shows marked deviation
15. B: Hint: Due to large size,  $CO_2$  shows maximum non ideal behavior
16. D: Hint: Non polar nature of  $Cl_2$
17. B
18. A: Hint:  $H_2O$  has strong Hydrogen-Bonding
19. B: Hint: Volatility order; which is opposite to the B.P  
 $HCl > HBr > HI > HF$
20. D: Hint: NaCl has ionic bond
21. A: Hint: 9% more empty spaces in ice
22. C: Hint: Graph No.iii,iv indicate that hydride of lower period No. show high B.P.
23. C
24. C: Hint: Anisotropic property is the one that depends upon direction of a crystal and this phenomenon is called anisotropy.
25. A: Hint:  $0^\circ C$  is a temperature at which water and ice co-exist.
26. A
27. D: Hint: Co-ordination of  $Na^+/Cl^- = 6$
28. D: Hint: According to the electron gas theory each atom in a metal crystal loses all of its valence electrons
29. D

### Unit 3 Atomic Structure

#### Proton, Neutron and electron

1. The nature of cathode rays in discharge tube: [2012]  
 A) Depends upon the nature of the gas used in discharge tube  
 B) Depends upon the nature of the cathode used in discharge tube  
 C) Is independent of the nature of the gas used in discharge tube  
 D) Depends upon the nature of anode in the discharge tube

#### Distribution of Mass Charge

2. If the charge value of electron,  $7.588 \times 10^{-19}$  coulombs  $\text{Kg}^{-1}$ , then what would be the mass of electron in grams (charge on electron is a  $1.60222 \times 10^{-19}$  coulombs)?

- A)  $9.1095 \times 10^{-31} \text{g}$  B)  $91.095 \times 10^{-31} \text{g}$   
 C)  $9.1095 \times 10^{-26} \text{g}$  D)  $0.919095 \times 10^{-26} \text{g}$

3. The charge of one gram of electron is:

- A)  $1.7588 \times 10^{-19} \text{C}$  B)  $1.7588 \times 10^{19} \text{C}$   
 C)  $1.7588 \times 10^{-19} \text{C}$  D)  $1.602 \times 10^{-19} \text{C}$

4. In atomic particles:

- A) Mass of electron is less than mass of electron  
 B)  $e/m$  of electron is equal to mass of electron  
 C) Mass of electron is equal to mass of electron  
 D) Charge of proton is almost equal to charge of electron

Deduce the number of protons, neutrons and electrons from given proton number and nucleon number

5. Which two elements are isotopes?

- A)  ${}^6\text{X}^{16}$  and  ${}^{10}\text{Y}^{16}$  B)  ${}^6\text{X}^{16}$  and  ${}^{10}\text{Y}^{12}$   
 C)  ${}^6\text{X}^{16}$  and  ${}^6\text{Y}^{12}$  D)  ${}^6\text{X}^{12}$  and  ${}^6\text{Y}^{12}$

6. Number of electrons present in  ${}^67\text{Ca}^{2+}$  will be:

- A) 28 B) 29  
 C) 30 D) 34

7. Isotopic symbol of ion of Sulphur-33 is  ${}^{33}_{16}\text{S}^{2-}$ . How many number of protons and neutrons are present if number electrons are 18?

- A)  $P = 18, n = 15$  B)  $P = 16, n = 17$   
 C)  $P = 16, n = 18$  D)  $P = 17, n = 16$

8. Among the following which contains same no. of electrons and proton but different no. of neutron:

[2017-Retake]

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- A) Isobars B) Isotopes  
 C) Isotones D) None of these

9. Number of neutrons in  ${}^{10}_6\text{C}$  will be:

- A) 30 B) 35  
 C) 38 D) 56

10. Which one of the following pairs has the same electronic configuration as possessed by neon ( ${}^{10}_{10}\text{Ne}$ )?

- A)  $\text{Na}^+, \text{Cl}^-$  B)  $\text{K}^+, \text{Cl}^-$   
 C)  $\text{Na}^+, \text{Mg}^+$  D)  $\text{Na}^+, \text{F}^-$

11. According to the number of protons, neutrons and electrons given in the table, which one of the following option is correct?

Species	Proton	Neutron	Electron
$\text{As}^{3+}$	33	42	30
$\text{Ga}$	31	39	28
$\text{Ca}$	20	20	20

- A)  $\text{As}^{3+}, \text{Ga}^{3+}, \text{Ca}$  B)  $\text{As}^{3+}, \text{Ga}^{3+}, \text{Ca}$   
 C)  $\text{As}^{3+}, \text{Ga}^{3+}, \text{Ca}^{2+}$  D)  $\text{As}^{3+}, \text{Ga}^{3+}, \text{Ca}^{2+}$

12. Number of electrons in the outermost shell of chloride ion ( $\text{Cl}^-$ ) is:

- A) 17 B) 7  
 C) 1 D) 8

13. Hydrogen loses an electron to form:

- A)  $\text{H}^+$  B)  $\text{H}_2^{2+}$   
 C)  $\text{H}$  D)  $\text{H}^-$

Shape of s, p and d-orbitals

14. Identify the correct option associated with the shape of p-orbital:

[2017-Retake]



22. Which of the following will increase in the value of principal quantum number 'n', the shape of the s-orbitals remains same although their sizes

- A) Decrease  
B) Increase  
C) Remain the same  
D) May or may not remain the same
23. Which quantum number tells us about orientation of orbitals?

[2010]

- A) Principle quantum number  
B) Azimuthal quantum number  
C) Spin quantum number  
D) Magnetic quantum number

### Electronic Configuration

24. Nitrogen has the atomic mass of 7. Which of the following electronic configuration is of a Nitrogen atom in ground state?

[2019]

- A)  $1s^2, 2s^2, 2p_x^2, 2p_y^1$   
B)  $1s^2, 2s^2, 2p_x^2, 2p_z^1$   
C)  $1s^2, 2s^2, 2p_x^1, 2p_y^1, 2p_z^1$   
D)  $1s^2, 2s^2, 2p_y^2, 2p_z^1$

25. Which of the following is the electronic configuration of Cr?

[2019]

- A)  $[Ar] 3d^5 4s^0$   
B)  $[Ar] 3d^4 4s^2$   
C)  $[Ar] 3d^5 4s^2$   
D)  $[Ar] 3d^5 4s^1$

26. Copper is a typical transition metal. Its atomic number is 29. In which oxidation state does it have partially filled orbital in d-subshell?

[2019]

- A)  $Cu^0$   
B)  $Cu^+$   
C)  $Cu^{2+}$   
D)  $Cu^{3+}$

27. Which is the correct electronic configuration of Chromium ( $Z=24$ )?

[2018]

- A)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^4, 4s^2, 3d^4$   
B)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^4, 3d^6$   
C)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1, 3d^5$   
D)  $1s^2, 2s^2, 3s^2, 2p^6, 3p^6, 4s^2, 3d^6$

28. The maximum number of electrons in electronic configuration can be calculate by using formula:

[2016]

- A)  $2n^2$   
B)  $2n^2 + 2$   
C)  $2n^2$   
D)  $2n^2 + 1$

29. There are four orbitals s, p, d and f. Which order is correct with respect to the increasing energy of the orbitals?

[2015]

- A)  $4s < 4p < 4d < 4f$   
B)  $4p < 4s < 4f < 4d$   
C)  $4s < 4f < 4p < 4d$   
D)  $4f < 4s < 4d < 4p$

23. Correct order of energy in the given sub-shells is:

[2013]

- A)  $5s < 3d < 3p < 4s$   
B)  $5s < 3d < 4s < 3p$   
C)  $3p < 3d < 5s < 4s$   
D)  $3p < 3d < 4s < 5s$

24. The relative energies of 4s, 4p and 3d orbitals are in the order

[2012]

- A)  $3d < 4p < 4s$   
B)  $4s < 3d < 4p$   
C)  $4p < 4s < 3d$   
D)  $4p < 3d < 4s$

25. Na may be denoted by \_\_\_\_\_ electron configuration notation.

[2008]

- A)  $1s^2 2s^1$   
B)  $[Ar] 4s^1$   
C)  $[Ne] 3s$   
D) None of these

### Ionization energy

26. The ionization energy of hydrogen atom is: (x)

[2010]

- A) Zero  
B)  $13.13 \text{ kJ/mole}$   
C)  $+1313 \text{ kJ/mole}$   
D)  $+1313 \text{ kJ/mole}$

27. The elements for which the value of ionization energy is low are

[2011]

- A) Gain electrons readily  
B) Lose electron less readily  
C) Gain electrons with difficulty  
D) Lose electron readily

28. Ionization energy decreases down the group from top to bottom due to:

[2019]

- A) Increase in proton number  
B) Increase in shielding effect of intervening electrons  
C) Decrease in atomic size  
D) Increase in atomic mass

29. In the second period of elements, although oxygen lies next to nitrogen yet its first ionization energy is lower than that of nitrogen because?

[2019]

- A) Oxygen is paramagnetic in character  
B) In oxygen, there exists repulsion between pair of electrons present in the same orbital of valence shell  
C) Nuclear charge of oxygen is greater than nitrogen  
D) Oxygen has higher electron affinity

### Electron affinity

30. Electron affinity of the atom is the energy released when:

[2018]

- A) Electron is added to gaseous atom  
B) Covalent bond of molecule is broken  
C) Electron is removed from gaseous atom  
D) Covalent bond is formed between the atoms



## Key &amp; Hints of Unit 3

1. C
2. C: Hint:  $m_e = 1.75 \times 10^{-31} \text{ Kg}$   
 $= 1.75 \times 10^{-31} \times 1.6 \times 10^{19}$   
 $= 9.1 \times 10^{-13} \text{ Kg}$   
 $9.1 \times 10^{-31} \times 1.6 \times 10^{19} \text{ g}$   
 $9.1 \times 10^{-13} \text{ g}$
3. C: Hint: Charge on electron =  $1.75 \times 10^{-19} \text{ C}$   
 Charge on 1Kg (1000) of  $e^- = 1.75 \times 10^{11} \text{ C}$   
 $1 \text{ g of } e^- = 1.75 \times 10^{11} \text{ C}$   
 Charge on 1g of  $e^- = 1.75 \times 10^{11} \text{ C}$
4. D: Hint: Charge on Electron and proton is equal to  $1.602 \times 10^{-19} \text{ C}$
5. B
6. A: Hint: No of electrons in  $\text{Ga}^{3+}$  = Atomic No - positive charge  
 $= 31 - 3$   
 $= 28$
7. B: Hint: Protons = 26  
 Neutron in  $^{32}\text{S} = 33 - 16 = 17$
8. B
9. D: Hint: No of neutron = Atomic Mass - Atomic No.  
 $= 66 - 30$   
 $= 36$
10. D: Hint: Electron present in  $\text{Ne} = 10 e^-$   
 Electrons present in  $\text{Na} = 11 e^-$   
 Electrons present in  $\text{F} = 9 e^-$   
 Due to same setup they must show similar electronic configuration
11. A: Hint:  $\text{As}^{3+}$  because it contain 33 protons but 30 electrons  
 It contain 3 protons and 28 electrons  
 Ca contain 20 protons and 20 electrons
12. D: Hint: Seven electrons because its group number is 7.
13. A: Hint:  $H \rightarrow H^+ e^-$
14. B
15. B: Hint: Upon increasing the value of 'n' size and energy of orbital increase but shape remains same
16. D: Hint: Magnetic Quantum number tells us about the space orientation of orbitals
17. C
18. D
19. A: Hint:  $_{29}\text{Cu} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1, 3d^{10}$   
 $_{29}\text{Cu}^{+2} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^0, 3d^9$   
 Now 3d subshell contain 9 electrons so it is partially filled.
20. C: Hint:  $_{26}\text{Fe} = 1s^2, 2s^2, 2p^6, 3p^6, 4s^2, 3d^6$

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In this electronic configuration 4s and 3d orbitals are half filled

21. C
22. A: Hint:  $4s < 4p < 4d < 4f$   
 n + l rule 4 5 6 7
23. B: Hint:  $5s > 3d > 4s > 3p$   
 n + l rule 5 5 4 4
24. B: Hint:  $4s < 3d < 4p$   
 n + l rule 4 5 5

According to n + l rule 3d and 4s have same n so their principal quantum number value depends on energy order

25. C
26. D
27. D
28. B
29. B: Hint:  $\text{CO} = \text{N} \equiv \text{N} > \text{F} > \text{O} > \text{P} > \text{Cl}$   
 In oxygen, 2p orbital is completely filled with electrons, therefore it is most electronegative
30. A: Hint:  $\text{Cl} > \text{S} > \text{P} > \text{N} > \text{C}$

A)  $\text{N} \equiv \text{N}$   
 B)  $\text{F} > \text{O}$   
 C)  $\text{P} > \text{Cl}$   
 D)  $\text{S} > \text{N}$

Which one of the following has the highest electronegativity?

A)  $\text{N} \equiv \text{N}$

B)  $\text{F} > \text{O}$

C)  $\text{P} > \text{Cl}$

D)  $\text{S} > \text{N}$

The electronegativity of chlorine is 3.16

A) 3.16

B) 3.16

C) 3.16

D) 3.16

Which of the following is the correct order of electronegativity?

A)  $\text{N} > \text{H}$

B)  $\text{O} > \text{F}$

C)  $\text{P} > \text{Cl}$

D)  $\text{S} > \text{N}$

NIT-4 Chemical Bonding

Ionic (Electrovalent) bond

The inter-ionic distance in a crystal of  $KClO_3$  is:

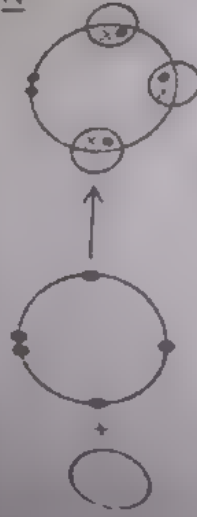
[2010]

- A) 314 pm  
B) 314 m  
C) 300 pm  
D) 300 m

Dot and cross Model

Show the correct statement

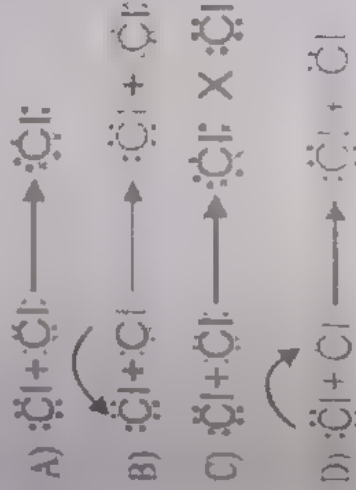
[2016]



- A)  $CH_4$   
B)  $CO$   
C)  $CH_3$   
D)  $NH_3$

Which one of the following is the correct dot and cross diagram of bonding between two chlorine atoms

[2015]



The suitable representation of dot structure of chlorine molecule is

[2014]



Covalent bonding in Co-ordinate (dative covalent) bonding

One of the following molecule has largest number of shared pair of electrons?

[2018]

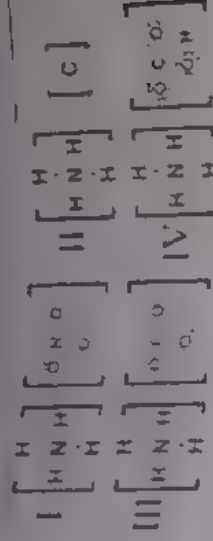
- A)  $NH_3$   
B)  $C_2H_4$   
C)  $CO_2$   
D)  $N_2$

Observe the given dot and cross structures for the following molecules or ionic species

The co-ordinate covalent bond exists between:

[2017]

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- A) All C atoms in structure III and IV  
B) N and one H in all four structure  
C) N and Cl atoms of structure II  
D) N and N atoms of structure I

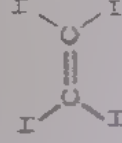
7. pi-bond is formed by sideways overlap of:

[2017-Retake]

- A) s-orbital  
B) p-orbital  
C) d-orbital  
D) None of these

8. Count the number of  $\sigma$  bonds and  $\pi$  bonds in the molecule:

[2016]



- A) 1  $\pi$  and 5  $\sigma$  bonds  
B) 2  $\pi$  and 4  $\sigma$  bonds  
C) 3  $\pi$  and 3  $\sigma$  bonds  
D) 6  $\pi$  and 6  $\sigma$  bonds
9. When the two partially filled atomic orbital overlap in such a way that the probability of finding the electron is maximum around the line joining the two nuclei, the result is the formation of:

[2014]

- A) Sigma bond  
B) Pi-bond  
C) Hydrogen bond  
D) Metallic bond
10. In 'H-F' bond Electronegativity difference is 2.0. What is the type of this bond?

[2012]

- A) Polar covalent bond  
B) Non-polar covalent bond  
C) pi (n) bond  
D) Co-ordinate covalent bond

11. The number of bonds in nitrogen molecule is:

[2010]

- A) One  $\sigma$  and one  $\pi$   
B) One  $\sigma$  and two  $\pi$   
C) Three  $\sigma$  only  
D) Two  $\sigma$  and one  $\pi$

12. Which type of bonding is present in  $NH_4Cl$

[2009]

- A) Ionic  
B) Covalent  
C) Co-ordinate Covalent  
D) All of these

13. If the electronegativity difference between bonded atom is zero, the bond between the two

atom is

[2009]

- A) Polar  
B) Partially Ionic  
C) Non-polar  
D) Both B and C

14. A bond is not formed:

15. The structure of Xenon trioxide is shown below. With reference to the Valence shell electron pair repulsion theory (VSEPR), the shape of  $\text{XeO}_3$  is; [2008]
- A) When both forces become equal to each other  
 B) When attraction forces dominate repulsive forces  
 C) When repulsive forces become equal to zero  
 D) When repulsive forces dominate attraction forces

#### Shapes and Bond Angles of molecules

16. Which one of the following molecules has  $sp^3$  hybridization? [2019]
- A) Trigonal pyramidal C) Tetrahedral  
 B) Bent (or angular) D) Trigonal planar

17. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$

18. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{CH}_4$   
 B)  $\text{C}_2\text{H}_2$   
 C)  $\text{CO}_2$   
 D)  $\text{CH}_4$

19. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$

20. What is the exact value of angle in  $\text{BF}_3$ ? [2017]
- A)  $90^\circ$   
 B)  $119.5^\circ$   
 C)  $104.5^\circ$   
 D)  $120^\circ$

21. According to Valence shell electron pair repulsion theory, the repulsive forces between the electron pairs of central atoms of a molecule are in the order: [2013]
- A) Lone pair-Bond pair > Lone Pair-Lone pair  
 B) Bond pair-Bond pair > Lone Pair-Lone pair > Lone pair-Bond pair  
 C) Lone pair-Bond pair > Bond pair-Bond pair > Lone pair-Lone pair  
 D) Lone Pair-Lone pair > Lone pair-Bond pair > Bond pair-Bond pair

22. The angle between hybridized p-orbital and three  $sp^3$  hybrid orbitals of each carbon atom is [2012]
- A)  $90^\circ$   
 B)  $119.5^\circ$   
 C)  $104.5^\circ$   
 D)  $120^\circ$

23. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$

24. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$

25. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$

26. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$

27. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$

- A)  $120^\circ$   
 B)  $90^\circ$   
 C)  $109.5^\circ$   
 D)  $180^\circ$

23. VSEPR theory helps in explaining:
- A) Attraction between atoms  
 B) Size of molecule  
 C) Nature of bond  
 D) Shape of molecule

24. Linear shape is associated with set of orbitals? [2009]
- A)  $sp^2$   
 B)  $dsp^2$   
 C)  $sp^3$   
 D)  $sp$

25. Which one of the following has zero dipole moment: [2019]
- A)  $\text{NH}_3$   
 B)  $\text{H}_2\text{O}$   
 C)  $\text{CHCl}_3$   
 D)  $\text{BF}_3$

26. Which one of the following has zero dipole moment: [2009]
- A)  $\text{CO}$   
 B)  $\text{CO}_2$   
 C)  $\text{H}_2\text{O}$   
 D)  $\text{BF}_3$

27. In crystal lattice of ice, each O-atom of water molecule is attached to: [2013]
- A) Four H-atoms  
 B) One H-atom  
 C) Two H-atoms  
 D) Three H-atoms

28. Which one of the following hydrogen bonds is stronger than other? [2013]
- A)  $\text{N}^{\delta-} \text{H}^{\delta+} \cdots \text{N}^{\delta-} \text{H}^{\delta+}$   
 B)  $\text{F}^{\delta-} \text{H}^{\delta+} \cdots \text{F}^{\delta-} \text{H}^{\delta+}$   
 C)  $\text{O}^{\delta-} \text{H}^{\delta+} \cdots \text{O}^{\delta-} \text{H}^{\delta+}$   
 D)  $\text{N}^{\delta-} \text{H}^{\delta+} \cdots \text{O}^{\delta-} \text{H}^{\delta+}$

29. DNA molecule is double stranded, in which the chains of DNA are twisted around each other by: [2011]
- A) Hydrogen bonds  
 B) Covalent bonds  
 C) Vander Waal's forces  
 D) Dative bonds

30. Which type of force is present in gasoline? [2010]
- A) dipole-dipole forces  
 B) dipole-induced dipole forces  
 C) Hydrogen bonding  
 D) London dispersive forces

31. London forces are very significant in: [2008]
- A) Sulphur  
 B) Phosphorous  
 C) Argon  
 D) Sugar

32. Which of the following sets constitutes of all the molecules and ions of non-planar geometry? [2019]
- A)  $\text{PH}_4^+$ ,  $\text{NH}_3$ ,  $\text{SO}_3$ , Benzene  
 B)  $\text{HC}\equiv\text{CH}$ ,  $\text{H}_2\text{O}$ ,  $\text{CBeCl}_2$ ,  $\text{H}_2\text{S}$   
 C)  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{BF}_3$ ,  $\text{NO}^+$   
 D)  $\text{CH}_4$ ,  $\text{NH}_4^+$ ,  $\text{MnO}_4^-$ ,  $\text{NF}_3$



Key & Hints of Unit 4

1. A
2. D
3. C
4. B
5. B: Hint: C has contains largest number of shared pair of e<sup>-</sup> because it having 6 bonds.
6. B
7. B
8. A
9. A
10. A: Hint: If  $\Delta E.N = 1$  then the bond is ionic bond. in case of  $HF \Delta E.N = 2.0$  but bond is still polar covalent because e<sup>-</sup> of hydrogen atom present in 1<sup>st</sup> shell.
11. B
12. D: Hint: In ammonium chloride, total three covalent bond is present, one ionic bond and one coordinate covalent bond.
13. C: Hint:  $\Delta E.N = 0$  then the bond is non-polar covalent bond.
14. D
15. A: Hint:  $XeO_3$  contains three bonded atoms and 1 lone pair so it shows trigonal pyramidal geometry like ammonia.
16. A
17. D: Hint:  $sp, sp^2$  hybridization show planar or co-planer geometry  
 $sp^3$  show co-planer geometry  
 $CH_4, NH_4^+, MnO_4^-$  and  $NF_3$  all show  $sp^3$  hybridization.
18. A
19. A: Hint:  $SiCl_4, NH_4^+$  and  $CH_4$  show perfect tetrahedral geometry
20. D: Hint:  $sp^2$  hybridization
21. D
22. B: Hint: Un hybridized p-orbital is perpendicular to the  $sp^2$  hybridized orbital.
23. D
24. D: Hint: In  $sp$  hybridization only 2 orbitals are formed and best shape is linear
25. D
26. A
27. A: Hint: In water each oxygen atom attach with 4 hydrogen atoms (two through covalent bond and two through H.B.)
28. B: Hint: Hydrogen bond in  $F \dots H$  is stronger due to max polarity
29. A
30. D: Hint: Non-polar nature

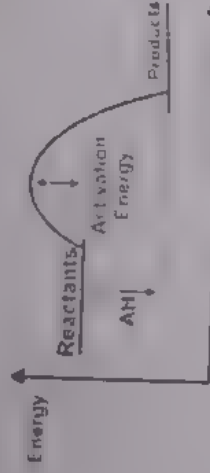
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31. A: Hint: Highest melting point among the given options shows Sulphur (S) do it contains strong and bond of dispersion force

## Unit 5 Chemical Energetics

## Concept of Energy changes during Chemical reactions

1. The given diagram shows the enthalpy changes during a chemical reaction. This diagram represents.



This diagram represents:

- A) A non-spontaneous process  
B) An isothermic process  
C) An endothermic reaction  
D) An exothermic reaction

2. Reaction of water with quick lime result in the rise in the temperature of the system. Using the concept of change, indicate the nature of the reaction.

- A) Third order reaction  
B) Non spontaneous reaction  
C) Endothermic reaction  
D) Exothermic reaction

3. Reactants have high energy than products in:

- A) Endothermic reactions  
B) Photochemical reactions  
C) Exothermic reactions  
D) Non-spontaneous reactions

4.  $\Delta H$  will be given a negative sign in

- A) Exothermic reactions  
B) Decomposition reactions  
C) Dissociation reactions  
D) Endothermic reactions

5. A spontaneous process is:

- A) Unidirectional and irreversible  
B) Irreversible and real  
C) Unidirectional and real  
D) All of above

6. Which of the following formation is an endothermic reaction?

- A)  $C_{(s)} + O_{2(g)} \rightarrow CO_2$   
B)  $Na_{2O} + O_{2(g)} \rightarrow 2NaHO_{2(g)}$

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( )  $2H_2 + O_2 \rightarrow 2H_2O$   
D) None of these

7. Which of the following is exothermic reaction?

- A)  $H^+ + OH^- \rightarrow H_2O$   
B)  $Na_2O + H_2O \rightarrow 2NaOH$   
C)  $1/2 H_2 \rightarrow H_{(g)}$   
D)  $2 Cl_2 \rightarrow 4 Cl$

8. Which of the following formation is endothermic reaction?

- A)  $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(l)}$   
B)  $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$   
C)  $N_{2(g)} + O_{2(g)} \rightarrow N_2O_{2(g)}$   
D) None of these

Concept of Energy changes during Chemical reactions Enthalpy changes of reaction

9. Which one of the following enthalpy changes is always exothermic?

- A) Enthalpy of solution  
B) Enthalpy of combustion  
C) Enthalpy of formation  
D) Enthalpy of atomization

10. Which enthalpy change is relevant in the following process



- A) Enthalpy of atomization  
B) Enthalpy of vaporization  
C) Enthalpy of fusion  
D) Enthalpy of formation

11. Which of the equations show the same "twice" the enthalpy change of neutralization as the following equation



- A)  $NH_4Cl + NaOH \rightarrow NaCl + H_2O + NH_3$   
B)  $MgCO_3 + 2HCl \rightarrow MgCl_2 + CO_2 + H_2O$   
C)  $KOH + HCl \rightarrow KCl + H_2O$   
D)  $H_2SO_4 + Mg(OH)_2 \rightarrow MgSO_4 + 2H_2O$

12.  $50.0 \text{ cm}^3$  of  $1.0 \text{ mol dm}^{-3}$  hydrogen acid react with  $50.0 \text{ cm}^3$  of  $1.0 \text{ mol dm}^{-3}$  sodium hydroxide. The temperature rises to  $6.5^\circ\text{C}$ . Calculate the enthalpy of neutralization. specific heat capacity of water is  $4.18 \text{ Jg}^{-1}^\circ\text{C}^{-1}$ .

- A)  $-54.0 \text{ KJmol}^{-1}$   
C)  $+54.0 \text{ KJmol}^{-1}$

13. determine the value of enthalpy of formation of  $NH_4Cl$ :

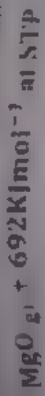
- A)  $-788 \text{ KJmol}^{-1}$   
C)  $-692 \text{ KJmol}^{-1}$

14. Enthalpy is measured at

- A)  $300 \text{ K}$  and  $2 \text{ atm}$

- B)  $300 \text{ K}$  and  $1 \text{ atm}$

D) 295 K and 1 atm



[2016]

of the above reaction will be called;

B)  $\Delta H_f^\circ$

D)  $\Delta H_c^\circ$

$\Delta H = 218 \text{ kJ mol}^{-1}$

[2016]

the reaction  $\Delta H$  will be called

A) enthalpy of atomization

C) enthalpy of decomposition

E) enthalpy of formation

F) enthalpy of the dissociation

2. For the reaction:  $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ ,  $\Delta H = 205.5 \text{ kJ mol}^{-1}$ . What will be

the enthalpy change in the above reaction?

[2015]

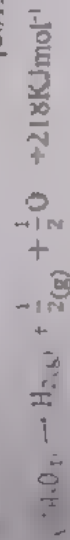
B) Zero  $\text{kJ mol}^{-1}$

D)  $1 \text{ kJ mol}^{-1}$

The equation that represents standard enthalpy of

atomization of hydrogen is

[2015]



Heat of formation ( $\Delta H_f^\circ$ ) for  $\text{CO}_2$  is:

[2014]

A)  $-390 \text{ kJ mol}^{-1}$

B)  $-394 \text{ kJ mol}^{-1}$

D)  $-294 \text{ kJ mol}^{-1}$

3. Standard enthalpy of atomization, heat of

atomization

[2011]

B) Decreases

enthalpy

enthalpy

enthalpy then decreases

4. Standard enthalpy of solution of ammonium

chloride is  $\text{kJ mol}^{-1}$ :

[2010]

B)  $+16.2$

D)  $+26.0$

5. When one mole of gaseous hydrogen ions are

dissolved in water to form, infinitely dilute

solution, amount of heat liberated is:

[2010]

A)  $-93.5 \text{ kJ mol}^{-1}$

C)  $-93.5 \text{ kJ mol}^{-1}$

Numerical Magnitude of Lattice

Energy

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23. Calculate the lattice energy of sodium chloride on the basis of Born Haber cycle when:

$\Delta H_f^\circ[\text{NaCl}] = -411 \text{ kJ mol}^{-1}$ ,  $\Delta H_{\text{sub}}^\circ[\text{Na}] = +107$

$\text{kJ mol}^{-1}$ ,  $\Delta H_{\text{ion}}^\circ[\text{Cl}] = +122 \text{ kJ mol}^{-1}$ ,  $\Delta H_{\text{hyd}}^\circ[\text{Na}^+] = +406$

$\text{kJ mol}^{-1}$ ,  $\Delta H_{\text{hyd}}^\circ[\text{Cl}^-] = -349 \text{ kJ mol}^{-1}$

[2017]

A)  $376 \text{ kJ mol}^{-1}$

B)  $787 \text{ kJ mol}^{-1}$

C)  $376 \text{ kJ mol}^{-1}$

D)  $787 \text{ kJ mol}^{-1}$

24. Lattice energy of an ionic crystal is the enthalpy

of:

A) Combustion

B) Dissolution

C) Dissociation

D) Formation

[2012]

Hess's Law to construct simple

energy cycles

25. Standard enthalpy of combustion of graphite at

$25^\circ\text{C}$  is  $-395.41 \text{ kJ mol}^{-1}$ . The enthalpy change for

graphite is

[2015]

A)  $1.91$

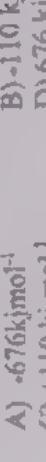
B)  $2.1$

C)  $-2.1$

D)  $+1.91$

26. Combustion of graphite to form  $\text{CO}_2$  can be done

by two ways. Reactions are given as follow:



[2014]

A)  $-676 \text{ kJ mol}^{-1}$

B)  $-110 \text{ kJ mol}^{-1}$

C)  $+110 \text{ kJ mol}^{-1}$

D)  $676 \text{ kJ mol}^{-1}$



**Key & Hints of Unit 5-A**

1. D: Hint: Reactants exist at higher energy level than products

2. D

3. C

4. A

5. C

6. A: Hint: Enthalpy of formation of water is exothermic so opposite reaction must be endothermic

7. C

8. B

9. B: Hint:  $\Delta H_f$ ,  $\Delta H_c$  always exothermic

10. A: Hint: It is called  $\Delta H_{\text{atom}}$  because 1 mole of sodium metal is converted into gaseous sodium upon breakage of metallic bonds.

11. D

12. A

13. D

14. C

15. D: Hint: It is called  $\Delta H_f$  because one mole of compound is formed from its element.

16. A

17. C: Hint: Heat of formation of water is always exothermic.

18. C: Hint: Enthalpy of atomization must be endothermic and only one mole of atom is formed from its element.

19. B

20. B: Hint: Enthalpy of atomization is endothermic so energy is transferred from surrounding to system and heat of surrounding decreased.

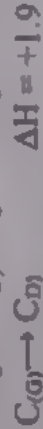
21. B

22. A: Hint: When ion is dissolved in water then energy is mostly released

23. D: Hint: Born Haber cycle calculation

24. C

25. D: Hint:  $C_{(g)} + O_2 \rightarrow CO_{2(g)}$   $\Delta H_c = -393.51$



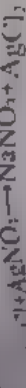
26. B: Hint: Solved in Hess's law

## Unit 6: Electrochemistry

## Redox Process

Which one of the following as a redox reaction?

[2013]



Metallic conduction involves the relatively free movement of their \_\_\_\_\_ throughout the metallic lattice:

[2010]

A) Atoms

B) Ions

C) Electrons

D) Molecules

The reaction which is responsible for the production of electricity in the voltaic cell is:

[2010]

A) Hydrolysis

B) Reduction

C) Oxidation

D) Redox

Oxidation numbers of Elements.

In  $\text{NO}$ , the oxidation number of N is.

[2017]

A) -5

B) +2

C) +3

D) -3

In  $\text{SO}_4^{2-}$  the oxidation number of Sulphur is

[2014]

A) +8

B) +8

C) +6

D) +6

In  $\text{MgCl}_2$ , the oxidation of Cl is

[2012]

A) Zero

B) +2

C) -2

D) -1

In all oxidation reactions, atoms of an element in a chemical species lose electrons and increases their

[2011]

A) Oxidation state

B) Electrode

C) Reduction states

D) Oxidation state

Sulphur has oxidation state of \_\_\_\_\_

[2008]

A) +2

B) +4 and +6

C) None of these

D) Both A and B

Study the following chemical equations by redox method

$\text{KCl} + 16\text{H}^+ + 2\text{MnO}_4^- + 5\text{Cl}_2 + 2\text{Mn}^{+2} + 8\text{H}_2\text{O}$

Which statement is true about this reaction?

[2016]

A) Manganese is oxidized from +7 to +2

B) Chloride ions are reduced from -1 to zero

C) Chlorine is reduced from zero to -1

D) KCl

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D) Manganese is reduced from +7 to +2

## Electrolytic Cell

10. For the purification of copper, impure copper is made the \_\_\_\_\_

[2017-Retake]

A) Cathode

B) Anode

C) Solution

D) Both A & B

11. In electrolysis of aqueous  $\text{CuCl}_2$ , the metal deposited at cathode is

[2012]

A) Sodium

B) Aluminum

C) Lead

D) Copper

12. When  $\text{CuSO}_4$  electrolyzed in aqueous solution using copper electrolyzed, then the substance which deposits at the cathode is.

[2008]

A) Copper metal

B) Copper ion

C) Hydrogen

D) Oxygen

## Standard electrode redox Potential

13. In galvanic cell a salt bridge is used in order to:

[2011]

A) Pass the electric current

B) Prevent the flow of ions

C) Mix solutions of two half cell

D) Allow movement of ions between two cells

14. The emf produced by Galvanic Cell is known as:

[2009]

A) Redox Potential.

B) Oxidation Potential

C) Cell Potential

D) None of the above

15. The potential difference of an electrochemical cell is measured by:

[2008]

A) Galvanometer

B) Voltmeter

C) Calorimeter

D) Ammeter

## Standard Hydrogen Electrode

16. The standard electrode potential of hydrogen is arbitrarily taken at 298 K is \_\_\_\_\_.

[2018]

A) 1.00 volt

B) 0.00 volt

C) 0.10 volt

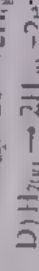
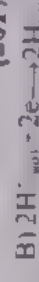
D) 10.0 volt

## Methods used to measure the

## standard Electrode potentials of metals

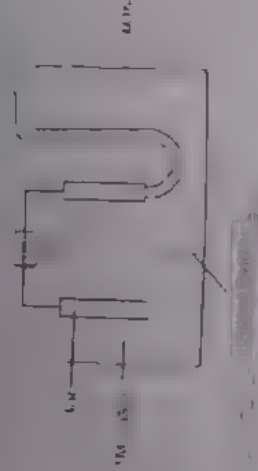
17. The  $E^\circ$  value of standard copper half-cell is +0.34V, measured when it is connected with, SHE i.e. standard hydrogen electrode. In this case the half reaction taking place at SHE is:

[2017]



18. The diagram shows a galvanic cell. The current will flow from:

[2016]



- A) Hydrogen electrode to copper electrode  
 B) Copper electrode to hydrogen electrode  
 C) Hydrogen electrode to HCl solution  
 D)  $\text{CuSO}_4$  solution to hydrogen electrode

Construct redox equations

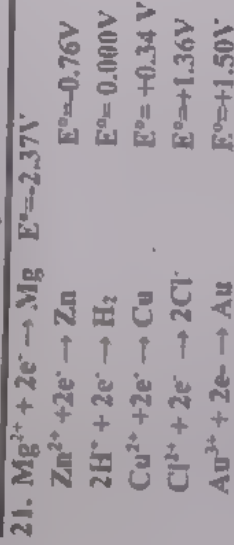
19. In an electrochemical series elements are arranged on the basis of:

- A) pH scale  
 B) pOH scale  
 C) pKa scale  
 D) hydrogen scale

20. Stronger the oxidizing agent, greater is the:

- A) Redox potential  
 B) Emf of the cell  
 C) Oxidation potential  
 D) Reduction potential

Construct Redox equations



Keeping in view the value of standard reduction potential given above, which one of the following would you select as a feasible redox chemical reaction?

- A)  $\text{Mg} + 2\text{H}^+ \rightarrow \text{Mg}^{2+} + \text{H}_2$   
 B)  $\text{Cu} + \text{Zn}^{2+} \rightarrow \text{Cu}^{2+} + \text{Zn}$   
 C)  $2\text{Cl}^- \xrightarrow{\text{H}_2} \text{Cl}_2 + 2\text{I}^-$   
 D)  $2\text{Au} + 6\text{H}^+ \rightarrow 2\text{Au}^{3+} + 3\text{H}_2$

22. Study the following facts



- A)  $\text{Cu} + \text{Zn}^{2+} \rightarrow \text{Cu}^{2+} + \text{Zn}$   
 B)  $\text{Cu}^{2+} + \text{Zn}^{2+} \rightarrow \text{Cu} + \text{Zn}$   
 C)  $\text{Cu}^{2+} + \text{Zn} \rightarrow \text{Cu} + \text{Cu} + \text{Zn}^{2+}$   
 D)  $\text{Cu}^{2+} + \text{Zn}^{2+} \rightarrow \text{Cu} + \text{Zn}^{2+}$

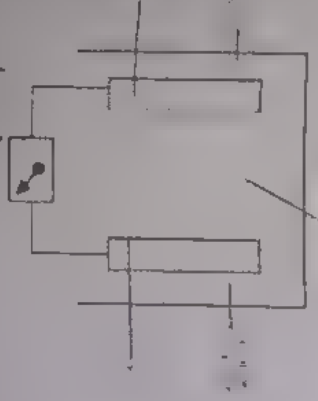
23. Keeping in mind the electrode potential which one of the following reactions is feasible?

[2015]

- A)  $\text{Zn}^{2+} + \text{Cu} \rightarrow \text{Cu}^{2+} + \text{Zn}$   
 B)  $\text{Zn} + \text{MgSO}_4 \rightarrow \text{ZnSO}_4 + \text{Mg}$   
 C)  $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$   
 D)  $\text{Cd} + \text{MgSO}_4 \rightarrow \text{CdSO}_4 + \text{Mg}$

24. In the figure given below, the electron external circuit is form

[2013]



- A) Zinc to copper electrode  
 B) Copper to zinc electrode  
 C) Right to left  
 D) Porous partition to zinc electrode

Advantages of developing the  $\text{H}_2/\text{O}_2$  Fuel cell

25. During space flights astronauts obtained water from:

[2017]

- A) Nickel cadmium cells  
 B) Fuel cell  
 C) Lead accumulator  
 D) Alkaline battery



Key & Hints of Unit 6

Hint: Na is oxidizing and Cl is reduced

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: SCl<sub>2</sub>

Hint: Al<sub>2</sub> shows +2 oxidation state and Cl

Hint: shows -1 oxidation state.

Hint: Sulphur shows -2, 0, +2, +4 and +6

Hint: state commonly

Hint: A anode Cu from impure Cu electrode

Hint: same as Q 10

Hint: Cu is deposits at cathode because their

potential value is greater than H.

Hint: Due to high reduction potential value Cu is

reduced and hydrogen is oxidized

Hint: In Cu and SHE galvanic cell SHE act as an

anode Cu act as a cathode so current flows from

anode to cathode

Hint: Al<sub>2</sub> will be oxidizing and H will be

reduced due to the higher reduction potential value

Hint: Zn will be oxidizing and Cu will be

reduced due to higher oxidation value of Zn

Hint: Cu will be reducing due to higher reduction

potential compared to the Zn.

Hint: In Cu - Zn galvanic cell Zn act as anode and

Cu act as cathode so current flows from Zn to Cu.

## UNIT 7: Chemical Equilibrium

Deduce expression for Equilibrium constant

1. For which of the following equilibrium reaction  $K_c$  has no unit?

[2016]

- A)  $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$   
 B)  $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$   
 C)  $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$   
 D)  $2NO_2(g) + O_2(g) \rightleftharpoons 2NO_3(g)$

2. Units of  $K_c$  for the following reaction is:  $H_2 + I_2 \rightleftharpoons 2HI$

[2010]

- A)  $\text{mol}^2 \text{dm}^{-6}$   
 B) no unit  
 C)  $\text{mol}^2 \text{dm}^3$   
 D)  $\text{mol}^2 \text{dm}^6$

3. Equilibrium constant  $K_c$  for  $H_2O \rightarrow H^+ + OH^-$

[2009]

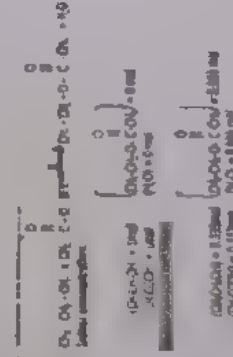
- A)  $K_c = [H^+]/[H_2O][OH^-]$   
 B)  $K_c = [OH^-]/[H_2O][H^+]$   
 C)  $K_c = [OH^-][H^+]/[H_2O]$   
 D)  $K_c = [H_2O]/[OH^-][H^+]$

Calculate the values of Equilibrium constants

4. Consider the following reversible reaction:

[2017]

$$K_c = 4 \text{ at } 100^\circ\text{C}$$



What are new equilibrium concentration of all species if 1 mole of each  $CH_3CH_2OH$  and  $CH_3COOH$  are added to this equilibrium mixture? (Apply Le Chatelier's principle) (Temperature remained same)

- A)  $(CH_3COOH) = 0.333 \text{ mol}$   $(CH_3COOCH_2H_3) = 1.666 \text{ mol}$   
 $(C_2H_5OH) = 1.333 \text{ mol}$   
 $(H_2O) = 0.666 \text{ mol}$   
 B)  $(CH_3COOH) = 1.333 \text{ mol}$   $(CH_3COOCH_2H_3) = 0.666 \text{ mol}$   
 $(C_2H_5OH) = 0.333 \text{ mol}$   
 $(H_2O) = 1.333 \text{ mol}$   
 C)  $(CH_3COOH) = 0.666 \text{ mol}$   $(CH_3COOCH_2H_3) = 1.333 \text{ mol}$   
 $(C_2H_5OH) = 0.666 \text{ mol}$   
 $(H_2O) = 1.333 \text{ mol}$

- D)  $(CH_3COOH) = 0.333 \text{ mol}$   $(CH_3COOCH_2H_3)$   
 $(C_2H_5OH) = 0.333 \text{ mol}$   
 $(H_2O) = 1.333 \text{ mol}$

5. The value of equilibrium constant  $K_p$  for reaction  $2HF(g) \rightleftharpoons H_2(g) + F_2(g)$  is  $10^1$  at 2000 K. Calculate the value of  $K_p$  for this reaction

- A)  $2 \times 10^{-13}$  B)  $10^{13}$   
 C)  $186 \times 10^{-13}$  D)  $3.48 \times 10^4$

6. Formation of  $NH_3$  is reversible and endothermic process what will happen on cooling?

- A) More reactant will form  
 B) More  $N_2$  will be formed  
 C) More  $H_2$  will be formed  
 D) More product ( $NH_3$ ) will be

7.  $NH_3$  is used as catalyst in Haber's process.  $NH_3$  gas manufacture

- A) Iron B) Carbon  
 C) Copper D) Silver

8. The  $K_a$  values of  $HCl$ ,  $CH_3COOH$ ,  $HF$  and  $H_2SO_4$  are  $10^{-7}$ ,  $1.8 \times 10^{-5}$ ,  $6.7 \times 10^{-4}$  and  $10^{-2}$  respectively. the decreasing order of acid strength is:

- A)  $HCl > HF > H_2SO_4 > CH_3COOH$   
 B)  $HCl > CH_3COOH > HF > H_2SO_4$   
 C)  $HCl > H_2SO_4 > HF > CH_3COOH$   
 D)  $CH_3COOH > HF > H_2SO_4 > HCl$

9. The product of the concentrations of each ion in saturated solution of a sparingly soluble salt at 298 K, the power of their relative concentrations

- A)  $K_{sp}$  B)  $K_s$   
 C)  $K_b$  D)  $K_w$

10.  $Ca(OH)_2$  is sparingly soluble having solubility product value  $6.5 \times 10^{-6}$  what will be its solubility

- A)  $2.75 \times 10^{-2}$  B)  $2.75 \times 10^2$   
 C)  $1.17 \times 10^{-2}$  D)  $3.63 \times 10^2$

11. Value of  $K_p$  for  $PbSO_4$  system at  $25^\circ\text{C}$  is equal to  
 A)  $1.6 \times 10^{-5} \text{ mol}^2 \text{dm}^{-6}$  B)  $1.6 \times 10^{-5} \text{ mol}^2 \text{dm}^{-6}$   
 C)  $1.6 \times 10^{-5} \text{ mol}^2 \text{dm}^{-6}$  D)  $1.6 \times 10^{-5} \text{ mol}^2 \text{dm}^{-6}$

12. Which one of the following is the correct representation for  $K_p$ ?

- $AgCl \rightleftharpoons Ag^+ + Cl^-$   
 A)  $K_p = \frac{[AgCl]}{[Ag^+][Cl^-]}$

- A) solubility  
 C) in saturation effect  
 D) 1 mole of acetate is 0.1 mole of acetate ionization percentage ionization

- A) 13  
 C) 1  
 D) 13  
 E) 13  
 F) 13  
 G) 13  
 H) 13  
 I) 13  
 J) 13  
 K) 13  
 L) 13  
 M) 13  
 N) 13  
 O) 13  
 P) 13  
 Q) 13  
 R) 13  
 S) 13  
 T) 13  
 U) 13  
 V) 13  
 W) 13  
 X) 13  
 Y) 13  
 Z) 13

- A) higher  $pK_a$  weak  
 B) lower  $pK_a$  strong  
 C)  $pK_a$  has no relation  
 D) both A and B

- B $^+$  (aq),  $[OH^-]$  (aq),  $[H^+]$  (aq) for strong and weak acids  
 D) The pH of  $10^{-2} \text{ M}$  hydroxide is

- A) 12  
 C) 13

17. According to Lowry concept  $H_2O$  is

- A) A base  
 B) An amphoteric species  
 C) A salt  
 D) An acid

18. What will be the pH of a solution of concentration of  $10^{-2} \text{ M}$

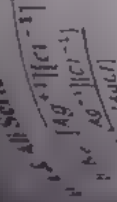
- A) 3  
 C) 11

19. The chemical substance which gives  $H^+$  is called

- A) Neutral  
 C) Base  
 D) A buffer solution is the change in

- A)  $pOH$   
 C)  $pK_a$

21. What is the correct representation of a buffer solution?



When  $AgCl$  solution, some salt of  $NaCl$  is added,  $AgCl$  will be precipitated due to

- [2011]  
 B) Electrolyte  
 D) Common ion effect

Acetic acid is dissolved per  $dm^3$  of solution, percentage ionization of acetic acid is:

- [2010]  
 B) 15  
 D) 13

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2010]  
 A) lower  $pK_a$ , weaker the acid  
 C) lower  $pK_a$ , stronger the acid

$pK_a$  has to relation with the strength of an acid with A and B

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2010]  
 A) lower  $pK_a$ , weaker the acid  
 C) lower  $pK_a$ , stronger the acid

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2010]  
 A) lower  $pK_a$ , weaker the acid  
 C) lower  $pK_a$ , stronger the acid

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2010]  
 A) lower  $pK_a$ , weaker the acid  
 C) lower  $pK_a$ , stronger the acid

- [2019]  
 B) 10  
 D) 14

According to Lowry - Bronsted Acid & base concept  $H_2O$  is

- [2018]  
 A) Base  
 C) Amphiprotic species

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2014]  
 B) 14  
 D) 7

What will be the pH of a solution of  $NaOH$  with a concentration of  $10^{-3} M$ ?

- [2014]  
 B) 14  
 D) 7

The chemical substance, when dissolved in water from  $H^+$  is called

- [2013]  
 B) Acid  
 D) Amphiprotic

A buffer solution is that which resists/minimizes the change in

- [2012]  
 B) pH  
 D)  $pK_a$

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

What is the correct rotation between pH and  $pK_a$ ?

- [2015]  
 B) 10  
 D) 14

- A) pH  $pK_a + \log\left(\frac{[Acid]}{[Base]}\right)$   
 B) pH  $pK_a - \log\left(\frac{[Acid]}{[Base]}\right)$   
 C) pH  $pK_a - \log\left(\frac{[Base]}{[Acid]}\right)$   
 D) pH  $pK_a + \log\left(\frac{[Base]}{[Acid]}\right)$

22. The 'pH' of our blood is

- [2013 & 2016]  
 A) 6.7-8  
 C) 7.5  
 B) 7.9  
 D) 7.35-7.4

23. Solubility of  $KClO_3$  can be decreased by

- [2009]  
 A) removing  $K^+$  ions from the solution  
 B) removing  $ClO_3^-$  ions from the solution  
 C) adding  $KCl$  from outside  
 D) adding  $NaNO_3$  from outside

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2010]  
 A) lower  $pK_a$ , weaker the acid  
 C) lower  $pK_a$ , stronger the acid

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2010]  
 A) lower  $pK_a$ , weaker the acid  
 C) lower  $pK_a$ , stronger the acid

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

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 A) lower  $pK_a$ , weaker the acid  
 C) lower  $pK_a$ , stronger the acid

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 C) lower  $pK_a$ , stronger the acid

- [2019]  
 B) 10  
 D) 14

According to Lowry - Bronsted Acid & base concept  $H_2O$  is

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For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

- [2014]  
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 D) 7

What will be the pH of a solution of  $NaOH$  with a concentration of  $10^{-3} M$ ?

- [2014]  
 B) 14  
 D) 7

The chemical substance, when dissolved in water from  $H^+$  is called

- [2013]  
 B) Acid  
 D) Amphiprotic

A buffer solution is that which resists/minimizes the change in

- [2012]  
 B) pH  
 D)  $pK_a$

For an acid is higher the stronger is the acid, the strength of acid with  $pK_a$ :

What is the correct rotation between pH and  $pK_a$ ?

- [2015]  
 B) 10  
 D) 14



## Key Hints of Unit 7

1. C: Hint: If no. of moles of reactants are equal, to no. of moles of products then no units of K.

2. C: Hint:  $K_c$  (moles dm<sup>-3</sup>)<sup>Δn</sup>

Δn = 0

$K_c$  (moles dm<sup>-3</sup>) = 1

3. C

4. C: Hint:



$$1 - x \quad 1 - x \quad x \quad x$$

$$K_c = \frac{[CH_3COOC_2H_5][H_2O]}{[C_2H_5OH][CH_3COOH]}$$

$$K_c = \frac{(x)(x)}{(1-x)(1-x)}$$

$$4 = \frac{x^2}{(1-x)^2}$$

Taking square root

$$2 = \frac{x}{1-x}$$

$$2-2x = x$$

$$2 = x+2x$$

$$2 = 3x$$

$$\frac{2}{3} = x$$



5. B: Hint:  $K_p = K_c (RT)^{\Delta n}$

$$K_p = K_c (RT)^{\Delta n}$$

$$K_p = K_c (1)$$

$$K_p = K_c = 10^{13}$$

6. D: Hint: Upon cooling reaction goes to reverse direction because it is exothermic reaction.

7. A

8. C: Hint: Acidic strength is directly proportional to the  $pK_a$ .

9. A



$$K_s = 4s^3$$

$$6.5 \times 10^{-7} = 4s^3$$

$$s^3 = 1.625 \times 10^{-6}$$

Taking cube root

$$s = 1.17 \times 10^{-2}$$

11. C

12. B

NCMS and National MDCAT by Adhyapeetham

13. D: Hint: Due to the common ion effect of AgCl (weak electrolyte) decrease addition of HCl (strong electrolyte).

14. D

15. D: Hint: Acidic strength is inversely proportional to the  $pK_a$ .

16. A: Hint:  $[NaOH] = [OH^-] = 10^{-3} M$

$$pOH = -\log(10^{-3})$$

$$= -(-3) \log 10$$

$$= +2(1) = 2$$

$$pH = 12$$

17. B: Hint: According to Lowry, Brønsted acid is  $H^+$  donor and base is  $H^+$  acceptor.

18. C

$$\text{Hint: } [NaOH] = [OH^-] = 10^{-3} M$$

$$pOH = -\log(10^{-3})$$

$$= -(-3) \log 10$$

$$pOH = +3(1) = 3$$

$$pH = 11$$

19. B

20. B

21. B

22. D: Hint:  $pH = pK_a + \log \frac{[CH_3COONa]}{[CH_3COOH]}$

$$[CH_3COONa] = [Base]$$

because  $CH_3COONa$  is a salt of strong base

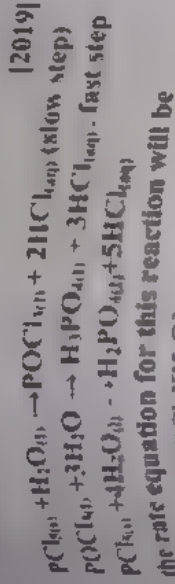
$$pH = pK_a + \log \frac{[Base]}{[Acid]}$$

23. C: Hint: Solubility of  $KClO_3$  (weak electrolyte) decreased by the addition of  $KCl$  (strong electrolyte) due to the common ion effect.

Unit 8: Reaction Kinetics

Rate of Reaction

The decomposition of phosphorus pentoxide in the presence of moisture takes place by the following mechanism:



The rate equation for this reaction will be

- A) Rate =  $k[\text{PCl}_5][\text{H}_2\text{O}]$   
 B) Rate =  $k[\text{PCl}_5][\text{H}_2\text{O}]^2$   
 C) Rate =  $k[\text{POCl}_3][\text{H}_2\text{O}]^3$   
 D) Rate =  $k[\text{PCl}_5][\text{H}_2\text{O}]^4$

[2019]

If the reactants or product of a chemical reaction can absorb ultraviolet, visible or infra-red radiation then the rate of a chemical reaction can best be measured by which one of the following methods?

- A) Chemical method  
 B) Spectrometry  
 C) Graphical method  
 D) Differential method

[2014]

The reaction rate in forward direction decreases with the passage of time because

- A) Concentration of reactants decreases  
 B) Concentration of product decreases  
 C) The order of reaction changes  
 D) Temperature of the system changes

[2012]

The rate of reaction involving ions can be studied by method:

- A) Dilatometric  
 B) Refractometric  
 C) Electrical conductivity  
 D) Optical rotation

[2010]

ORDER OF REACTION

If concentration time graph of a reactant indicates a constant half-life then the order reaction with respect to that reactant is:

[2018]

- A) First order  
 B) second order  
 C) Zero order  
 D) half order

2A + B → Product if the reactant 'B' is in excess the order of reaction with respect to 'A' in given rate law  $\text{rate} = k[A]^2[B]$  is

[2017]

- A) 2<sup>nd</sup> order reaction  
 B) 1<sup>st</sup> order of reaction  
 C) pseudo 1<sup>st</sup> order reaction  
 D) 3<sup>rd</sup> order reaction

7. unit of k in first order reaction is:

[2017]

- A) s<sup>-1</sup>  
 B) mol dm<sup>-3</sup> s<sup>-1</sup>  
 C) mol dm<sup>-3</sup>  
 D) mol<sup>-1</sup> dm<sup>3</sup>

8. Rate of first order reaction depends on—:

[2017]

- A) concentration of one reactants  
 B) concentration of three reactants  
 C) concentration of two reactants  
 D) Independence of the initial conc.

9. When the change in concentration is  $6 \times 10^{-4}$  mol.dm<sup>-3</sup> and time for that change is 10 seconds the rate of reaction will be:

[2015]

- A)  $6 \times 10^{-3}$  mol.dm<sup>-3</sup> sec<sup>-1</sup>  
 B)  $6 \times 10^{-4}$  mol.dm<sup>-3</sup> sec<sup>-1</sup>  
 C)  $6 \times 10^{-2}$  mol.dm<sup>-3</sup> sec<sup>-1</sup>  
 D)  $6 \times 10^{-5}$  mol.dm<sup>-3</sup> sec<sup>-1</sup>

10. For the reaction  $2\text{NO} + \text{O}_2 \rightleftharpoons 2\text{NO}_2$  the rate equation for the forward reaction is:

[2014]

- A) Rate =  $k[\text{NO}][\text{O}_2]$   
 B) Rate =  $k[\text{NO}]^2[\text{O}_2]$   
 C) Rate =  $k[\text{NO}_2]^2$   
 D) Rate =  $k[\text{NO}_2]$

11. In zero order reaction, the rate is independent of

[2013]

- A) concentration of the product  
 B) temperature of the reaction  
 C) concentration of the reactant  
 D) surface of the product

12. The rate equation determined experimentally for this reaction

[2009]



If Rate =  $k[(\text{CH}_3)_3\text{CHr}]$ , Hence it is which of the following is correct?

[2009]

- A) fractional order  
 B) pseudo first order  
 C) first order  
 D) second order

Half-life of a first order Reaction

13. The rate constant 'K' is 0.693 min<sup>-1</sup>, the half-life for the 1<sup>st</sup> order reaction will be

[2016]

- A) 1 min  
 B) 2 min  
 C) 0.693 min  
 D) 4 min

14. The half-life of N<sub>2</sub>O<sub>5</sub> at 24 minutes. How long will it take for sample of N<sub>2</sub>O<sub>5</sub> to decay to 25% of its original concentration?

[2015]

- A) 24 minutes  
B) 72 minutes  
C) 120 minutes  
D) 48 minutes

## Collisions

15. According to the collision theory of biomolecules reactions in gas phase, minimum amount of energy required for an effective collision is known as: [2011]

- A) Heat of reaction  
B) Has no effect on the reaction  
C) Rate of reaction  
D) Energy of activation

## Activation Energy

16. If the energy of activation of a chemical reaction is very low, the rate of the chemical reaction is observed to be very high because? [2019]

- A) Reaction proceeds without any transition state  
B) Number of efficient or fruitful collisions increase  
C) Conc. of reactants becomes irrelevant  
D) Molecules of reactants move slowly

17. What is the measure of activation energy is an endothermic reaction?

- A) The energy of activation of forward reaction is less than that of backward reaction [2019]  
B) The energy of activation of forward -backward reaction is same  
C) The energy of activation of backward reaction is less than that of forward reaction  
D) The energy of activation of backward reaction is more than that of forward reaction

## Catalysis

18. Role of a catalyst in a chemical reaction is not. [2018]

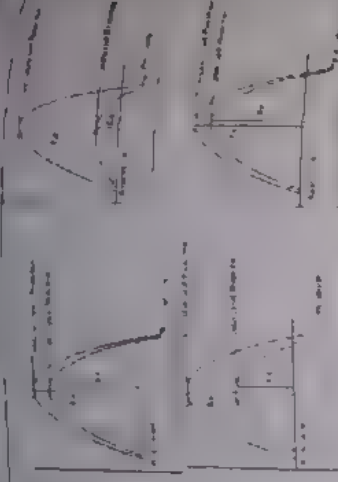
- A) Increase rate of reaction  
B) Decrease yield of a reaction  
C) Decrease rate of a reaction  
D) Increase yield of product

19. Choose the type of catalysis in the following reaction: [2017]



- A) Homogeneous catalysis  
B) Heterogeneous catalysis  
C) Biological catalysis  
D) Gas catalysis

20. Which one of the following graphs is representation for more rapid catalyzed reaction? [2017]



21. In some reactions a product formed acts as a catalyst, this phenomenon is called [2013]

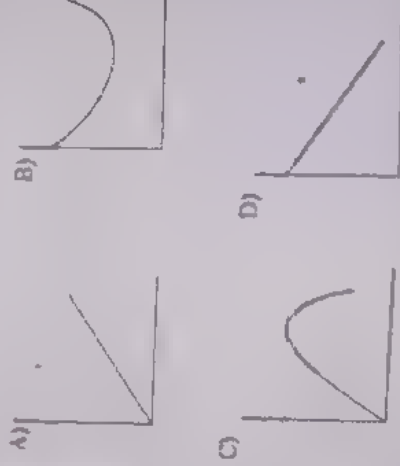
- A) Negative catalysis  
B) Activation of catalyst  
C) Heterogeneous catalysis  
D) Autocatalysis

22. It is experimentally found that catalyst is used to [2011]

- A) lower the activation energy  
B) Increase the activation energy  
C) lower the pH  
D) Decrease the temperature of other reactants

## ENZYMES AS BIOLOGICAL CATALYSTS:

23. By considering Arrhenius equation, the graph between,  $\frac{1}{T}$  and  $\log k$  gives a curve of the type: [2013]



24. Glucose is converted into ethanol by the enzyme present in the yeast: [2010]

- A) Urease  
C) Zymase  
B) Invertase  
D) Sucrose



1. Hint: In slowest step, one molecule of  $\text{PCl}_5$  and one molecule of  $\text{H}_2\text{O}$  are involved.  
 $\text{rate} = k [\text{PCl}_5] [\text{H}_2\text{O}]$

2. Hint: According to the law of mass action Rate of reaction  $\propto$  [reactants]

3. Hint: If reaction ions are present then reaction rate curve shows conduction.

4. Hint: In first order reaction, half-life have no relationship with initial concentration of reaction.

5. Hint: Rate is not depending upon 'B' because it is present in large excess.

6. Hint:  $K^a = (\text{mole dm}^{-3})^n \cdot \text{sec}$   
 $= (\text{mole dm}^{-3})^{1/2} \cdot \text{sec}^{-1}$   
 $= \text{mole dm}^{-3/2} \cdot \text{sec}^{-1}$

7. A  
 D: Hint: Rate  $= \Delta x / \Delta t$

Rate  $= 6 \times 10^{-4} / 10 = 6 \times 10^{-5} \text{ mol dm}^{-3} \cdot \text{sec}^{-1}$

10. B

11. C

12. B: Hint: Rate is only depends upon  $(\text{CH}_3)_3\text{CBr}$  but not depends upon water because water present in large excess.

13. A: Hint:  $[t_{1/2}] = 0.693/k$   
 $= 0.693 / 0.693$   
 $= 1 \text{ min}$

14. B: Hint:  $100\% \rightarrow 50\% \rightarrow 25\%$

15. A: Hint:

t = total time

t = no. Of half life

$\frac{t}{2} = 2 \times 24 \text{ min} = 2$

$= 48 \text{ min}$

16. D

17. B

18. C: Hint: In exothermic reaction,

$$E_f - \Delta H + E_b$$

$$E_f > E_b$$

19. A: Hint: Catalyst increase the rate of reaction by decreasing the activation energy.

20. A: Hint: Catalyst and reactants are in the same physical state. So it is an example of homogeneous catalysis.

21. C: Hint: Graph 'C' indicate that catalyst decrease the activation energy of reaction. So reaction will be more rapid.

22. D

23. A

24. D

## UNIT 9 PERIODS

## ATOMIC RADIUS

1. Modern periodic remains same along a period? [2010]  
 A) Atomic mass B) Proton number  
 C) Mass number D) Nucleon number
2. In modern periodic table, the elements in group II B are: [2009]  
 A) Zn, Cd, Pb B) Zn, Cd, Hg  
 C) Zn, Cd, Ba D) Zn, Cd, Bi
3. Following graph shows a physical property along period 3 elements which physical property is [2017]
- 
- A) Electron affinity  
 B) Non-metallic character  
 C) Atomic radius  
 D) Melting point up to group IVA
4. Keeping in view the size of atoms which order is correct? [2015]  
 A)  $N > C$  B)  $P > Si$   
 C)  $Ar > Cl$  D)  $Li > Be$
5. Along a period, atomic radius decreases, this gradual decrease in radius is due to: [2013]  
 A) Increase in number of shells  
 B) Increase in number of protons in the nucleus  
 C) Melting and boiling points first decrease then increase  
 D) Melting and boiling points first increase then decrease
6. Which one remains same along a period? [2012]  
 A) Atomic radius  
 B) Melting point  
 C) Number of shells (orbits)  
 D) Electrical conductivity
- IONIC RADIUS:**
7. Ionic radius along the period decrease due to: [2017]  
 A) Addition of a new shell  
 B) Increase in nuclear charge

C) Increase in mass number

D) Decrease in nuclear charge

8. The ionic radius of fluoride ion is:

A) 12 pm

B) 95 pm

C) 136 pm

D) 157 pm

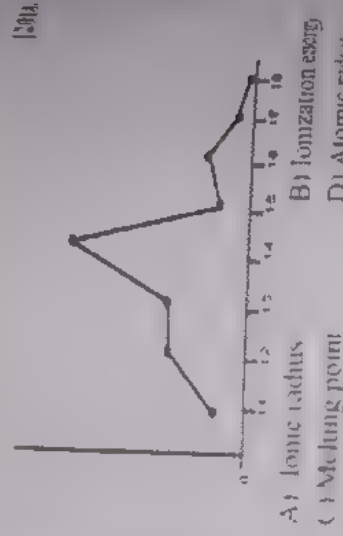
9. Which one of the following will have the least radius?

A)  $Al^{3+}$ B)  $Si^{4+}$ C)  $Mg^{2+}$ D)  $Na^{+}$ 

## MELTING POINT AND BOILING POINT:

10. The following sketch shows the variation of physical property of third period elements against atom number:

What physical property is plotted in this sketch



11. In period 2 and period 3 maximum point are by elements:

A) Lithium and sodium

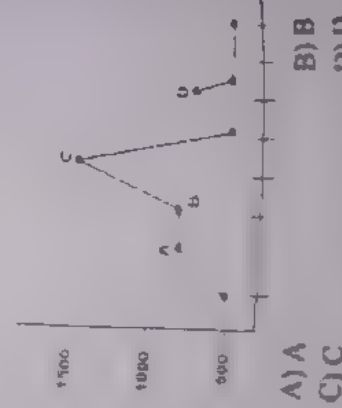
B) Neon and argon

C) Carbon and silicon

D) Nitrogen and phosphorous

12. The following sketch shows the melting point of eight elements with concentration atomic number which elements is silicon?

[2011]

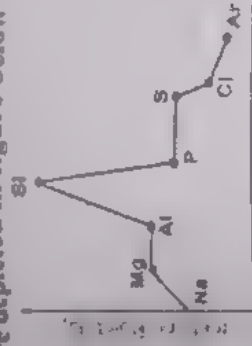


13. Melting point of a NaCl Mg decrease down group due to:

- NUMS and National MDCAT by Ali Sudais
17. Which of the following is not a trend in the periodic table?
- Strong electronegativity
  - Strong attractive force
  - Increment in size
  - High ionization energy
18. The melting points of group IIA elements are higher than those of group I-A because:

- [2016]
- atoms of IIA elements have smaller size
  - IIA elements are more reactive
  - atoms of IIA elements provide two binding electrons
  - IIA elements have smaller atomic radius

19. The trends in melting points of the elements of 3<sup>rd</sup> period are depicted in figure below



The sharp decreases observed from 'Si' to 'P' is due to:

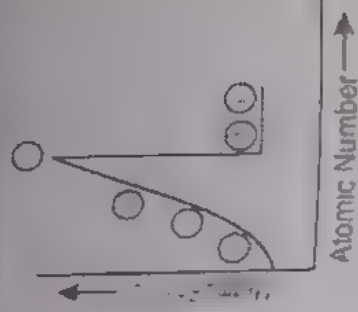
- [2014]
- decrease in atomic radius from 'Si' to 'P'
  - change in bonding and structure of two elements
  - different densities of two elements
  - increase in electron density from 'Si' to 'P'

20. What is the trend of melting and boiling of the elements of short periods as we move from left to right in a periodic table?

- [2013]
- Melting and boiling points decrease gradually
  - Melting and boiling point first decrease then increase
  - Melting and boiling points increase gradually
  - Melting and boiling points first increases then decreases

21. The diagram below is a plot of melting points of elements of second period against their atomic numbers. Lithium and fluorine are placed at the extreme ends of the plot on the basis of melting points where would you place carbon among the empty slot on the plot?

[2011]



18. Arrange the following elements according to the trends of ionization energies C, N, Ne, B:
- 1
  - 2
  - 4
  - 3

IONIZATION ENERGY:

19. The elements for which the value of ionization energy is low are:

[2014]

- Ne < N < C < B
- B < N < C < Ne
- B < C < N < Ne
- Ne < B < C < N

20. More the ionization energy of an elements

[2012]

- Gain electrons readily
- Gain electrons with difficulty
- Loss electrons less readily
- Loss electrons readily

21. Energy required to remove an electron from gaseous neutral atom is

[2012]

- More the electro positivity
- More the reducing power
- Less the metallic character
- Bigger the atomic radius

22. Oxidation number of particular elements can be directly or indirectly inferred from its:

[2010]

- Electron affinity
- Ionization energy
- Lattice energy
- Crystal energy

OXIDATION STATES:

23. Oxidation number of particular elements can be directly or indirectly inferred from its:

[2019]

- Atomic mass
- physical state
- group number
- atomic size



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Key & Hints of Unit 9

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1. B
2. B
3. C: **Hint:** Atomic radii decrease along the period due to increase in nuclear charge.
4. D: **Hint:** The size of Li is greater than Be because Li is present in group IA while Be is present in group IIA.
5. B: **Hint:** Along the period the melting point and boiling point increases up to IVA group decreases because it depends upon number of unpaired electrons.
6. C: **Hint:** No. Of electrons increases in the same shell across the period.
7. B: **Hint:** Ionic Radii order  
 $\text{Si}^{4+} < \text{Al}^{3+} < \text{Mg}^{2+} < \text{Na}^{+}$
8. C
9. B
10. C: **Hint:** Melting point and boiling point increases up to Si - 14 then decreases.
11. C
12. C: **Hint:** Si shows highest melting point due to maximum unpaired electrons present in it.
13. C: **Hint:** Group IIA elements having two unpaired electrons and group IA elements having one unpaired electron.
14. C
15. B: **Hint:** Na, Mg and Al show metallic lattice while P and S show molecular nature.
16. D
17. D: **Hint:** Carbon shows maximum melting point because it contains maximum unpaired electrons.
18. C
19. D
20. C
21. B
22. C

UNIT 10 Groups

Reactions of group II elements

Among the following which one is least reactive metal:

- A) Mg  
B) Na  
C) Ca  
D) Be

[2017]

Alkaline earth metal hydroxide decomposes on heating. Which of the following reactions is a correct representation of this decomposition?

[2012]

- A)  $M(OH)_{2(s)} \rightarrow MO_{(s)} + H_2O_{(g)}$   
B)  $MOH_{(s)} \rightarrow M_2O_{(s)} + H_2O_{(g)}$   
C)  $2MOH_{(s)} \rightarrow 2MO_{(s)} + H_{2(g)}$   
D)  $4MOH_{(s)} \rightarrow 4M_{(s)} + H_2O_{(g)} + O_{2(g)}$

3. When the elements of group IIA are exposed to air, they quickly become coated with layer of oxide. What is the purpose of this oxide layer

[2011]

- A) The oxide layer exposes the metal to atmospheric attack  
B) The oxide layer increases the reactivity of metal  
C) The oxide layer protects the metal from further attack  
D) The oxide layer gives the metal a shiny look

4. Which of the following does not react with water?

[2008]

- A) Li  
B) Na  
C) Mg  
D) Be

Thermal Decomposition And Solubility Of Compounds Of Group II Elements:

5. Down the group acid-base behavior of metallic oxides of group 2 elements changes to:

[2018]

- A) More basic  
B) Less basic  
C) No change  
D) More acidic

6. Alkaline earth metal oxide reacts with water to give hydroxide. The solubility of alkaline earth metal oxide in water increase as we move from top to bottom in a group, which of the following alkaline earth metal oxide is least soluble in water?

[2013]

- A) BaO  
B) SrO  
C) MgO  
D) CaO

7. Which of the following carbonate of alkali metal is not stable towards heat and oxide on decomposition along with  $CO_2$ ?

[2010]

- A)  $K_2CO_3$   
B)  $Na_2CO_3$   
C)  $Li_2CO_3$   
D)  $CaCO_3$

PROPERTIES OF HALOGEN AND THEIR COMPOUNDS:

NCMS and National MDCAT by Ali Sudais

8. Which of the following element is not present in halogens?

[2019]

- A) Cl  
B) I  
C) F  
D) Fe

9. Aqueous solution of Iodine and sodium hydroxide were mixed in a round bottom flask at  $70^\circ C$ . following chemical reaction was carried out.  $3I_2 + 6NaOH \rightarrow NaIO_3 + NaI + H_2O$  in reaction is termed as

[2019]

- A) Redox reaction  
B) Free radical reaction  
C) Precipitation reaction  
D) Substitution reaction

[2012]

10. Which halogen molecule  $X_2$  has lowest dissociation energy?

- A)  $Cl_2$   
B)  $Br_2$   
C)  $I_2$   
D)  $F_2$

[2010]

- A) HF  
B) HCl  
C) HBr  
D) HI

12. Name the rare halogen among the following:

[2008]

- A) F  
B) Cl  
C) I  
D) At

Reaction of chlorine

13. In \_\_\_\_\_ above disproportionation reaction the oxidation state of chlorine is converted from zero to \_\_\_\_\_ and \_\_\_\_\_

[2017]



- A) -1, +1  
B) -1, +3  
C) -1, +5  
D) +5, +7

14.  $2NaOH_{(aq)} + Cl_{2(aq)} \rightarrow NaCl + NaClO$   $H_2O$  proceed at:

[2016]

- A)  $50^\circ C$   
B)  $200^\circ C$   
C)  $-10^\circ C$   
D)  $15^\circ C$

Comparison of Oxidizing power of Halogens

15. On the basis of oxidation power of halogens which reaction is possible?

[2016]

- A)  $I_2 + 2Cl \rightarrow Cl + 2I$   
B)  $Br_2 + 2I \rightarrow I + 2Br$   
C)  $Cl_2 + 3F \rightarrow F + 2Cl$   
D)  $I_2 + 2Br \rightarrow Br + 2I$

Uses of Halogens and compounds of Halogens

16. CFC's are organic compounds, which are derivatives of saturated hydrocarbons. They have

high bond dissociation values therefore they are inert and nontoxic for the living organisms. The word CFC's stands for;

[2019]

- A) Chlorofluorocarbons
- B) Carbofluorochlorines
- C) Chlorofluorocarbides
- D) Chlorofluorocarbons

17. Halogen are being used as fire extinguisher, mild antiseptic CFCs and many other organic chemicals, which of the following halogen is used to kill the bacteria in drinking water?

[2018]

- A) Chlorine
- B) Iodine
- C) Bromine
- D) Fluorine

#### Old Topics

18. Which noble gas is alpha emitter?

[2017]

- A) Xenon
- B) Radon
- C) Krypton
- D) Argon

19. Which one of the following gases is used as mixture for breathing by sea divers?

[2015]

- A) Oxygen and nitrogen
- B) Nitrogen and helium
- C) Helium and oxygen
- D) Helium and hydrogen

20. Radon is \_\_\_\_\_ Emitter and Being Radioactive Is Used in \_\_\_\_\_ Treatment in Radiotherapy:

[2014]

- A)  $\beta$  cancer
- B)  $\alpha$  cancer
- C)  $\beta$  kidney stone
- D)  $\alpha$  kidney stone

21. Which one of the following noble gas is used for providing an inert atmosphere for welding?

[2014]

- A) Helium
- B) Neon
- C) Argon
- D) Krypton

22. The electronic structure of carbon monoxide is represented as

[2013]



23. Carbon has the unique ability to form long chain by bonding with other carbon atoms, this property of self-linking in carbon is known as:

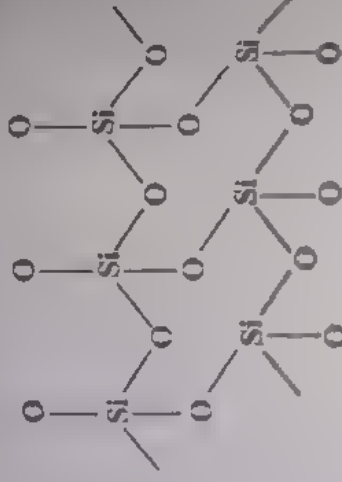
[2012]

- A) Condensation d
- B) Polymerization
- C) Cyclization
- D) Catenation

## NUMS and National MDCAT by Ali Series

24. Given below is a diagram of a dioxide of silicon in which each silicon atom is tetrahedrally bonded to four oxygen atom and each oxygen atom is bonded to two silicon atoms. In this structure the overall ratio silicon to oxygen atom in  $\text{SiO}_2$  is

[2017]



A) 2:2

C) 2:1

B) 1:2

D) 1:4

25. The trend in the densities of elements of group IIIA of the periodic table is:

[2010]

- A) A gradual decrease
- B) A gradual increase
- C) First decrease then increase
- D) First increase then decrease

1. B: Hint: B given opti

2. A: Hint: N earth met

3. C

4. D: Hint:

5. A: Hint:

6. C

7. C: Hint: strong e

8. D

9. A

10. C: Hint:  $\text{Cl}_2 > \text{Br}_2$

11. D: Hint:  $\text{HI} > \text{HBr}$

12. D

13. B

NaCl

$+1 + \text{Cl}$

$\text{Cl} = -1$

$\text{NaClO}_2$

$+1 + \text{Cl}$

$\text{Cl} = +5$

$\text{Cl} = +5$

14. D

15. A: Hin

the gre

16. B

17. C

18. B

19. A

20. A

21. D

22. B

23. B



K<sup>+</sup> & Hints of Unit 10

B. Hint: Be is least reactive metal among the

given options due to its high I.E

A: Hint:  $M(OH)_2$  is a correct formula of alkaline

; earth metal hydroxide.

C. Hint: Be not reacts with water due to its high

I.E

A: Hint: Down the group, basicity increases.

C. Hint:  $K_2CO_3$  is stable carbonates due to the

strong electrostatic force of attraction present between large size cation and anion.

D

A

C: Hint: Bond dissociation energy

$Cl_2 > Br_2 > F_2 > I_2$

D: Hint: Acid strength order

$HI > HBr > HCl > HF$

D

B

NaCl

$-1 + Cl = 0$

$Cl = -1$

$NaClO_3$

$-1 + Cl + (-2) \times 3 = 0$

$Cl = +5$

$Cl = +5$

D

A: Hint: Br is reducing and I<sup>-</sup> is oxidized due to the greater reduction potential of Br.

B

C

B

A

A

D

B

B

## UNIT 11 Transition Elements

## Electronic Configuration

1. Scandium has atomic number 21, which one will be its electronic configuration?

[2017]

- A)  $1s^2, 2s^2, 2p^6, 3s^2, 3d^1$   
 B)  $1s^2, 2s^2, 2p^6, 3s^2, 3d^2, 4s^1$   
 C)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 4p^2$   
 D)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^1, 4p^2$

2. Which element of 3d series of periodic table shows the electronic configuration of  $3d^6, 4s^2$ ?

[2016]

- A) Copper  
 B) Cobalt  
 C) Zinc  
 D) Nickel

3. Electronic configuration of gold  $[Au^{100}]$  is

[2015]

- A)  $[Xe] 4f^{14}, 5d^{10}, 6s^1$   
 B)  $[Xe] 4f^{14}, 5d^{10}, 6s^2$   
 C)  $[Xe] 4f^{14}, 5d^9, 6s^2$   
 D)  $[Xe] 4f^{14}, 5d^{10}, 6s^2$

4. Electronic configuration of manganese (Mn) is:

[2014]

- A)  $[Ar] 3d^5 4s^2$   
 B)  $[Ar] 3d^5 4s^1$   
 C)  $[Ar] 3d^5 4s^1$   
 D) None

5. Which pair of transition elements shows abnormal electronic configuration?

[2012]

- A) Sc and Zn  
 B) Cu and Sc  
 C) Zn and Cu  
 D) Cu and Cr

## Binding Energy

6. Which one is most stable element on the basis of binding energy?

[2008]

- A) Sn  
 B) Ba  
 C) Kr  
 D) Fe

## Variable Oxidation states

7. Identify the element that has maximum oxidation states:

[2017]

- A) Zinc  
 B) Chromium  
 C) Vanadium  
 D) Manganese

8. The anomalous electronic configuration shown by chromium and copper among 3-d series of elements is due to:

[2016]

- A) Stability associated with this configuration  
 B) Variable oxidation states of metals  
 C) Colour of ions of these metals  
 D) Complex formation tendency of metals

9. Which one pair has the same oxidation state of 'Fe'?

- A)  $FeSO_4$  and  $FeCl_2$   
 C)  $FeCl_2$  and  $FeCl_3$

- D)  $Fe_2(SO_4)_3$  and  $FeSO_4$

10. Oxidation state of 'Fe' in  $K_4[Fe(CN)_6]$  is

[2017]

- A) +2  
 C) -6

11. Oxidation state of 'Mn' in  $KMnO_4$  is in the order  $MnO_2$  and  $MnSO_4$  is in the order

- A) +7, +6, +2, +4

- C) +7, +6, +4, +2

## Colour Of Transition Metal Complexes

12. Violet color of  $[Ti(H_2O)_6]^{3+}$  ions is due to the

- A) Central metal ion

- C) Water molecules

13.  $[Ti(H_2O)_6]^{3+}$  transmits:

- A) yellow and red light

- C) red and white light

14. Colour of the transition metal ions/complex due to the electrons present in

- A) d-orbital

- C) p-orbital

## Uses as a Catalyst

15. Among the following which is a catalyst in a process

- A)  $V_2O_5$

- C)  $NH_4Cl$

## Formation of Complexes

16. How many ligands  $K_4[Fe(CN)_6]$  contain

- A) 4

- C) 6

17. ligands having two lone pair of electron donation to the central transition metal are known as:

- A) Monodentate ligand

- C) Hexadentate ligands

18. Tick the correct statement

- A) chelates are more stable than ordinary ones

- B) ordinary complexes are more stable than chelates

- C) monodentate ligand from chelates

- D) chelates have no ring structure

The geometry of complexes depends upon type of -  
taking place in the valence shell of central metal

atom:

[2010]

- A) Protonation  
B) Hybridization  
C) Deprotonation  
D) Dissociation

geometry and isomerism of complex ions

(coordination number 4 and 6

with percentage of carbon in different types of iron

products is in the order of

[2014]

- A) Cast iron > wrought iron > steel  
B) Wrought iron > steel > cast iron  
C) Cast iron > steel > wrought iron  
D) Cast iron > steel = wrought iron

The paramagnetic character of substances is due

to the presence of:

[2011]

- A) Bond pair of electrons  
B) Lone pair of electrons  
C) Unpaired electrons in the atom or molecules  
D) Paired electrons in the valence shell of atom

Paramagnetic behaviour of atom ions or molecules

is due to:

[2010]

- A) Paired electrons  
B) Unpaired electrons  
C) Protons  
D) Neutrons

acidified  $\text{KMnO}_4$  acts as:

[2010]

- A) Reducing agent  
B) Excellent precipitating agent  
C) Oxidizing agent  
D) Germicide

The shape of  $[\text{Co}(\text{NH}_3)_6]^{3+}$  complex is:

[2008]

- A) Square planar  
B) Linear  
C) Tetrahedral  
D) Octahedral

With increase in number of unpaired electrons  
paramagnetism

[2008]

- A) Increase  
B) Decrease  
C) Remain constant  
D) Decrease then increase



## Key &amp; Hints of Unit 11

1. B
2. D
3. A
4. A
5. D
6. D
7. D: Hint: Maximum oxidation state  
 $Zn = +2$   
 $Cr = +6$   
 $V = +5$   
 $Mn = +7$
8. A: Hint: If subshells (ss, p, d, f) are completely filled or half filled than this electronic configuration is more stable.
9. B
10. D: Hint:  $K_3 [Fe(CN)_6]$   
 $(+1) 3 + Fe + (-1) 6 = 0$   
 $Fe - (-3) = 0$   
 $Fe = +3$
11. C
12. A
13. D: Hint:  $Ti^{+3}$  absorb yellow light and it look violet in colour that is the combination of red and blue colour.
14. A: Hint: Compounds of transition elements are coloured due to d-d excitation
15. A
16. C
17. B
18. A
19. B
20. C
21. C
22. B
23. C
24. D
25. A

UNIT 12: Compounds of nitrogen and Sulphur

Inertness of Nitrogen

For nitrogen and oxygen are present in atmosphere but they do not react with each other under normal conditions, because:

- A) Oxygen is found in less concentration [2019]
- B) Nitrogen requires catalyst
- C) Nitrogen is highly inactive gas
- D) Nitrogen is very inactive

Nitrogen is present in air as a major constituent. It is an inactive gas in comparison with oxygen which is the major constituent of air. Nonreactive nature of nitrogen is due to the reason;

[2018]

- A) There is a triple covalent bond in nitrogen molecule which is very strong and molecule is non polar

- B) There is a triple covalent bond in nitrogen molecule which is very strong and molecule is polar
- C) Nitrogen have three unpaired electrons in its 2p orbital which is comparatively stable electronic configuration
- D) There is one lone pair of electrons on each nitrogen atom in its molecule

1. Percentage of nitrogen by volume in air is:

[2017]

- A) 500/10
- B) 78%
- C) 20%
- D) 98%

2. The essential property of a fertilizer is that it should be;

[2013]

- A) Immiscible
- B) Insoluble
- C) Highly soluble
- D) Partially soluble

3. Nitrogen is required by plants for the \_\_\_\_:

[2011]

- A) Formation of starch and sugar
- B) Development of roots and leaves
- C) Stimulation of early growth
- D) Formation of fruit

4. Potassium fertilizers are especially useful for:

[2009]

- A) Mango
- B) Tobacco
- C) Wheat
- D) Rice

Nitrogenous Fertilizer

1. The essential property of a fertilizer is that it should be;

[2018]

NUMS and National MDCAT by Ali Sudais

- A) Immiscible
- B) Insoluble
- C) Highly soluble
- D) Formation of fruit

8. Liquid ammonia has become an important fertilizer for direct application to soil. It contains \_\_\_\_ Nitrogen: [2017]

- A) 46%
- B) 82%
- C) 14%
- D) 17%

9. Nitrogen is required by plants for the \_\_\_\_: [2017]

- A) Formation of starch and sugar
- B) Development of roots and leaves
- C) Stimulation of early growth
- D) Partially soluble

10. Synthesis of ammonia by Haber's process is a reversible reaction. What should be done to increase the yield of ammonia in the following reaction?



- A) Pressure should be decreased
- B) Ammonia should remain in the reaction mixture
- C) Pressure should be increased
- D) Concentration of nitrogen should be decreased

11. About 80% of ammonia is used for the production of [2015]

- A) Explosives
- B) Fertilizers
- C) Nylon
- D) Polymers

12. Urea is the most widely used nitrogen fertilizer in Pakistan. Its composition is [2015]

- A)  $\text{NH}_2\text{CO}$
- B)  $\text{N}_2\text{H}_5\text{CO}_2$
- C)  $\text{N}_2\text{H}_4\text{CO}_2$
- D)  $\text{N}_2\text{H}_4\text{CO}$

13. What is the percentage of nitrogen in  $\text{NH}_4\text{NO}_3$ ? [2014, 2016]

- A) 65%
- B) 35%
- C) 20%
- D) 58%

14. The presence of calcium is essential for normal development of plants. An adequate supply of calcium appears to stimulate development of which part of plants: [2014]

- A) Leaves
- B) Fruit
- C) Branches
- D) Root hairs

15. Which one of the following is the correct chemical reaction for ammonia formation by Haber process? [2014, 2017]

- A)  $N_{2(g)} + 3H_{2(g)} \rightarrow NH_{3(g)}$   
 B)  $2N_{2(g)} + 3H_{2(g)} \rightarrow NH_{3(g)}$   
 C)  $2N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$   
 D)  $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

16. The nature of an aqueous solution of ammonia ( $NH_3$ ) is

- A) Amphoteric [2013, 2015]  
 C) Neutral  
 B) Basic  
 D) Acidic

17. The catalyst used in the Haber's process is

- A) Iron crystals with metal oxide promoters [2013]  
 B) Magnesium oxide  
 C) Aluminum oxide  
 D) Silicon dioxide

18. In the Haber process for the manufacturing of ammonia, nitrogen is taken from

- A) Proteins occurring in living bodies [2012, 2015]  
 B) Ammonium salts obtained industrially  
 C) Air  
 D) Minerals containing nitrates

19. In modern Haber process plants, the temperature maintained during the process is

- A) 670 - 770 K (400°C - 500°C) [2012]  
 B) 270 - 370 K (0°C - 100°C)  
 C) 370 - 470 K (100°C - 200°C)  
 D) 570 - 600 K (300°C - 380°C)

20. The presence of calcium is essential for normal development of plants. An adequate supply of calcium appears to stimulate development of which part of plants:

- A) Leaves [2010]  
 B) Fruit  
 C) Branches  
 D) Root hairs

Presence of Sulphur Dioxide in atmosphere

21. For an equilibrium reaction:  
 $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$

The forward reaction is exothermic, increase in temperature shift the equilibrium position towards left because:

- A) The concentration of  $SO_2$  and  $O_2$  decrease and concentration of  $SO_3$  increase as the temperature increase [2019]  
 B) The concentration of  $SO_2$  and  $O_2$  increase and concentration of  $SO_3$  decrease as the temperature increases

C) concentration of  $SO_2$  and  $O_2$  increase and concentration of  $SO_3$  stays same as the temperature increases

D) The concentration of  $SO_2$ ,  $SO_3$  and  $O_2$  increase the temperature increase

22. In contact process, optimum temperature lies between \_\_\_\_ ?

- A) 200 - 300°C [2019]  
 B) 300 - 400°C  
 C) 400 - 500°C  
 D) 300 - 500°C

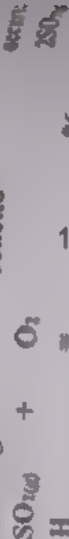
23. Unpolluted rain water has a pH of:

- A) 4.9 [2019]  
 B) 5.3  
 C) 5.6  
 D) 7.0

24. Which one of the following is anhydride of sulphuric acid?

- A) Sulphur (II) oxide [2019]  
 B) Sulphur (IV) oxide  
 C) Iron pyrite  
 D) Sulphur (VI) oxide

25. During contact process of  $H_2SO_4$  synthesis, in following reaction



which step used to increase the yield of  $SO_3$ ?

- A) Temperature is raised to very high degree [2019]  
 B)  $SO_3$  formed is removed quickly  
 C) Both temperature and pressure are kept very low  
 D) An excess of air is used to deviate equilibrium to right side

26. The acid rain water has pH

- A) Below 5 [2014]  
 B) 7  
 C) Between 5 and 7  
 D) Between 7 and 14

27. The unpolluted rain water is slightly acidic due to reaction of rain water with

- A) Sulphur dioxide [2013, 2014]  
 B) Carbon dioxide  
 C) Oxides of nitrogen

D) Hydrocarbons present in air

28. In contact process the catalyst used for conversion of  $SO_2$  to  $SO_3$  is:

- A) Magnesium oxide [2011]  
 B) Silicon dioxide  
 C) Aluminium Oxide  
 D) Vanadium pentaoxide

Manufacturing of Sulphuric Acid

29. In contact process, to which substance adequate quantities of water is added to convert it to Sulphuric acid?



- B)  $\text{SO}_2$   
D)  $\text{HSO}_4$

32. Catalyst used for the manufacture of  $\text{H}_2\text{SO}_4$  in contact process is:

[2018]

- B)  $\text{SO}_3$   
D)  $\text{Pt/Pd}$

33.  $\text{SO}_2$  formed in Contact process is absorbed in %

[2017]

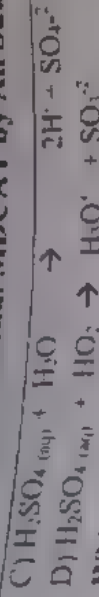
- B) 80  
D) 89

34. Which one of the following is correct equation of concentration of sulphuric acid?

[2014]



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33. Which one of the following product is obtained when sulphur trioxide is absorbed in concentrated Sulphuric acid [2014]

- A) Oleum B) Aqua regia  
C) Hydrogen sulphide D) Sulphate ion

34. In contact process for manufacturing sulphuric acid, sulphur trioxide ( $\text{SO}_3$ ) is not absorbed because [2012]

- A) The reaction does not go to completion  
B) The reaction is highly exothermic  
C) The reaction is quite slow  
D)  $\text{SO}_3$  is insoluble in water

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Sulphuric acid as Dehydrating agent and Oxidizing agent

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Key of Unit 12

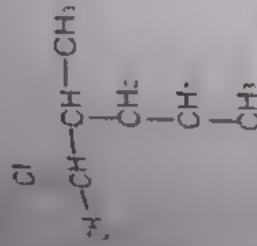
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1. C
2. A
3. B
4. C
5. C
6. B
7. C
8. B
9. C
10. C
11. B
12. D
13. B
14. D
15. D
16. B
17. A
18. C
19. A
20. D
21. B
22. C
23. C
24. D
25. D
26. A
27. B
28. D
29. B
30. A
31. C
32. B
33. A
34. B

Unit 13: Fundamental principles

The Organic compounds

Which one of the following is the best name according IUPAC system for the formula given below?



[2017]

- A) 4-methyl-6-chloro heptane
- B) 2-chloro-3-methyl hexane
- C) 2-chloro-4n-propyl hexane
- D) 2-chloro-4n propyl pentane

1. Cyclobutane structure is categorized under:

[2017-Retake]

- A) Aromatic compounds
- B) Alicyclic compounds
- C) Aliphatic compounds
- D) Heterocyclic compounds

2. Skeletal formula of an organic compound is given below:

[2016]

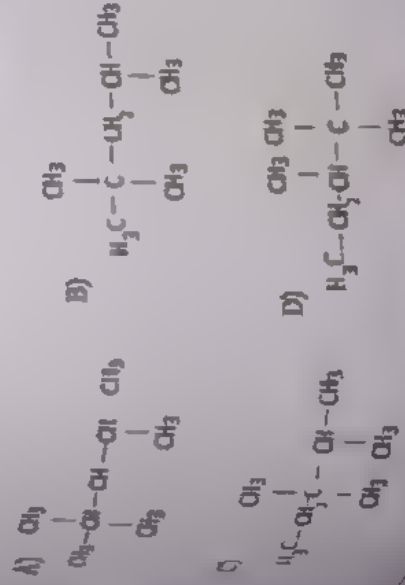


It is a hydrocarbon. IUPAC name of the compound is:

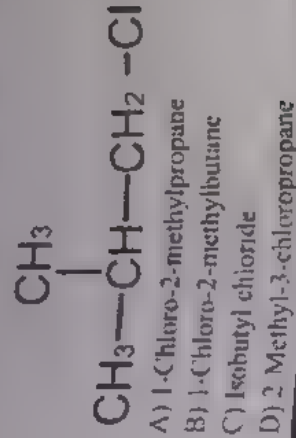
- A) 3,3 dimethyl,3-hexene
- B) 3,4 dimethyl,3-hexene
- C) 3-hexene
- D) 2,3 dimethyl 1-hexene

3. The structural formula of 2,3,4-Trimethylpentane is:

[2015]



5. The IUPAC name of the given compound is: [2015]



Alkanes and Alkenes of lower masses.

6. Which one of the following is used as typical catalyst for catalytic cracking? [2017]

- A) Mixture of  $\text{SiO}_2$  and Ni
- B) Mixture of Pt and Cu
- C) Mixture of Fe and  $\text{MgO}$
- D) Mixture of  $\text{SiO}_2$  and  $\text{Al}_2\text{O}_3$

7. What should be the temperature and pressure respectively for catalytic cracking: [2017-Retake]

- A)  $500^\circ\text{C}$ , 2 atm
- B)  $900^\circ\text{C}$ , 2 atm
- C)  $500^\circ\text{C}$ , 3 atm
- D)  $900^\circ\text{C}$ , 4 atm

8. Ethene on polymerization, give the product polyethene, this reaction may be called as [2012]

- A) Addition
- B) Condensation
- C) Substitution
- D) Pyrolysis

9. Ethyne molecule is formed when two carbon atoms joined together to form a sigma bond only: [2010]

- A) sp-s overlap
- B)  $\text{sp}^2-\text{sp}^2$  overlap
- C) sp-sp overlap
- D) 2py-2py overlap

10. A gasoline of higher octane number can be obtained by: [2010]

- A) Oxidative cleavage
- B) Steam cracking
- C) Thermal cracking
- D) Catalytic cracking

11. In this process, higher hydrocarbons can be cracked at lower temperature and lower pressure. [2008]

- A) Thermal cracking
- B) Catalytic cracking
- C) Steam cracking.
- D) Reforming.

Nucleophiles, electrophiles and free radicals

12. The species which are produced by heterolytic bond donors are know: [2018]

- A) Free radicals  
C) Cation

13. Among the following, which one is nucleophile? [2017]

- A)  $H^+$   
C)  $Ca^{++}$   
B)  $OH^-$   
D) None of

14. Which one of these is NOT a nucleophile? [2016]

- A)  $NH_3$   
C)  $NH_4^+$   
B)  $H_2O$   
D)  $NO_2^+$

15. Select a nucleophile from the following examples [2013]

- A)  $NH_4^+$   
C)  $NH$   
B)  $NO_2$   
D)  $NO$

16. In the following, which one is free radical [2012]

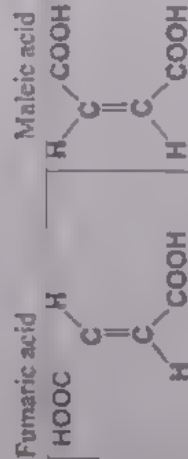
- A)  $Cl^+$   
C)  $Cl^-$   
B)  $Cl^*$   
D)  $Cl^-$

17. The compound with an atom which has an unshared pair of electrons is called [2011]

- A) Nucleophile  
C) Electrophile  
B) Protophile  
D) None of these

#### Isomerism

18. Maleic acid and fumaric acid, both have chemical  $C_4H_4O_4$ , the structure of these acids is shown below:



Maleic acid and Fumaric acid are:

- A) Positional isomers  
C) Metameres  
B) Structural isomers  
D) Cis-trans isomers

19. Which of the following molecules shows cis-trans isomers?

- A)  $C_2HCl_3$   
C)  $C_2H_4$   
B)  $C_2H_2Cl_4$   
D)  $C_2H_2Br_2$

20. Butane molecule can have max. no of isomers:

- A) 2  
C) 5  
B) 4  
D) 3

21. The type of structural isomerism which arises due to the difference in the nature of carbon chain or carbon skeleton is:

- A) Chain isomerism  
C) Cis-trans isomerism  
B) Position isomerism  
D) Optical isomerism

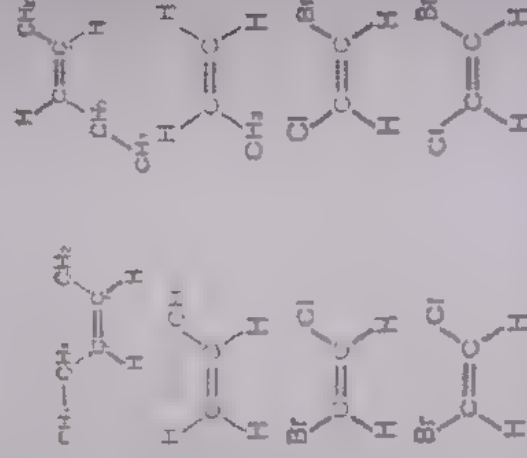
22. Name the compound which shows geometrical isomerism:

- A) 1-bromo-2-chloropropene  
B) 2-pentene  
C) 2,3-dimethylpropene  
D) Both A & B

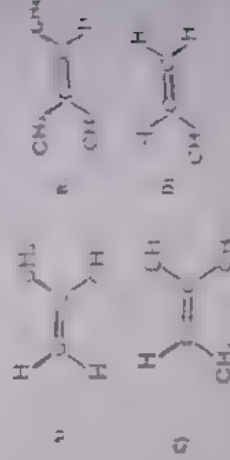
23. Which of the following pairs can be a cis isomer to each other?

- A)  $CHCl_2 = CCl_2$  and  $CH_2 = CH_2$   
B)  $CHCl = CH$  and  $CH_2 = CHCl$   
C)  $CH_3 - CH = CH - CH_3$  and  $H_3C - CH = CH - CH_3$   
D)  $CH_3 - CH_3$  and  $CH_2 = CH_2$

24. Which one of the following pair of compounds is *cis* and *trans* isomerism of each other?



25. The cis-isomerism is shown by:



26. Which one of the following compounds show *cis* or *trans* isomerism?

- A) 1-butene  
C) 1-hexene  
B) 1-bromo-2-chloropropene  
D) Propene

27. 1-chloropropane and 2-chloropropane are isomers of each other. The type of isomerism



[2011]

- 1) Cis-trans isomerism  
2) Positional isomerism  
3) Chain isomerism  
4) Functional group isomerism

5)  $\text{CH}_3\text{-O-CH}_3$  is example of \_\_\_\_\_ isomerism.

[2008]

- A) Metamerism  
B) Functional group  
C) Chain  
D) Position

### Functional group and Nomenclature of organic compounds.

6) The names of functional groups in the following compound \_\_\_\_\_ are;



[2019]

- A) Primary alcohol, nitrile and benzene ring  
B) Secondary alcohol, nitrile and phenol ring  
C) Secondary alcohol, amine and benzene ring  
D) Secondary alcohol, nitrile and aryl ring

7) Which of the following is a ketone?

[2015]

- A)  $\text{CH}_3\text{-O-CH}_2\text{-CH}_3$   
B)  $\text{CH}_3\text{-CO-CH}_2\text{-CH}_3$   
C)  $\text{CH}_3\text{COCOOH}$   
D)  $\text{CH}_3\text{-CH}_2\text{-CHO}$

8) In which of the following carbon is double bonded with itself?

[2008]

- A) Alkane  
B) Ether  
C) Alkene  
D) Alkyne

## Key &amp; Hints of Unit 13

1. B
2. B
3. B
4. A
5. A
6. D
7. A
8. A
9. C: Hint: In the ethyne carbon show  $sp$  hybridization. So C-H bond is formed due to the  $sp-s$  overlapping.
10. D
11. B
12. D: Hint: Upon heterolytic bond breaking cation and anion are formed. Anion contains unshared pair of  $e^-$  so it is called as Nucleophile in organic chemistry.
13. B
14. C
15. C: Hint:  $NH_3$  is a nucleophile because it contain lone pair.
16. D: Hint:  $Cl\cdot$  is a free radical because it contain unpaired  $e^-$ .
17. A
18. D
19. D
20. A: Hint: Two isomers of butane n-butane and iso-butane.
21. A
22. D
23. C
24. A
25. C
26. B
27. B: Hint: Due to the difference of position of chloro group these compounds are the example of positional isomerism.
28. B
29. B
30. B
31. A

## NIT 14. Hydrocarbons

## Combustion of Alkane

Catalytic Oxidation of alkanes result in formation of

[2017]

- (A) Carboxylic acid  
(B) Aldehyde  
(C) Ketone  
(D) Alcohol

Which one of the following reactions shows combustion of a saturated hydrocarbon?

[2016]

- (A)  $C_2H_6 + 3O_2 \rightarrow 2CO_2 + 2H_2O$   
(B)  $C_2H_6 + 2O_2 \rightarrow CO_2 + 2H_2O$   
(C)  $C_2H_6 + 1/2O_2 \xrightarrow{100^\circ C, 200 atm} CH_3OH$   
(D)  $C_2H_6 + 5/2O_2 \rightarrow 2CO_2 + H_2O$

Which compound is the most reactive one?

[2009]

- (A) Ethyne  
(B) Ethane  
(C) Benzene  
(D) Ethene

## Halogenation of Alkane

Reaction mechanism of alkanes with halogens is known as:

[2018]

- (A) Addition  
(B) Free radical substitution  
(C) Elimination  
(D) Propagation

## Preparation of Alkenes:

Which compound is obtained by the elimination of bromopropane?

[2018]

- (A) Butene  
(B) Ethene  
(C) Propene  
(D) Propane

## Reaction of Alkenes:

Treatment of ethene with cold sulphuric acid followed by reaction with boiling water yields:

[2019]

- (A) Ethane  
(B) Ethyne  
(C) Ethanal  
(D) Ethanol

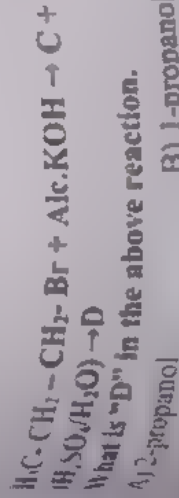
Alkenes undergo:

[2019]

- (A) Nucleophilic substitution  
(B) Nucleophilic addition  
(C) Electrophilic addition  
(D) Electrophilic substitution

In the reaction sequence:

[2019]

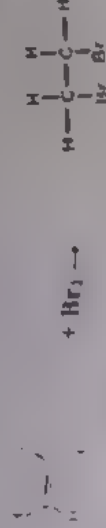


## NUMS and National MDCAT by Ali Sudais

- (C) Propanoic acid  
(D) Mixture of methanol and ethanol

9. Bromination of alkene is shown in the following reaction. This reaction is used for?

[2018]



- (A) Identification of primary and secondary alcohols  
(B) Detection of double bond  
(C) Detection of Aldehydes  
(D) Detection of ketones

10. Addition of unsymmetrical reagent to an unsymmetrical alkene is governed by:

[2014]

- (A) Cannizzaro's Reaction  
(B) Kricheldorf Rule  
(C) Aldol condensation  
(D) Markownikov's Rule

11. Ethylene glycols are used as:

[2014]

- (A) Anesthetic  
(B) Knocking agent  
(C) Freezing agent  
(D) Anti-freezing agent

12. What is the product formed when propene reacts with HBr?

[2013]

- (A)  $CH_3-CH_2-CH_2Br$   
(B)  $BrCH_2-CH=CH_2$   
(C)  $CH_3-CH(Br)-CH_3$   
(D)  $CH_3-CH(Br)-CH_2Br$

13. In the reaction of Ethene with bromine the intermediate formed is:

[2012]



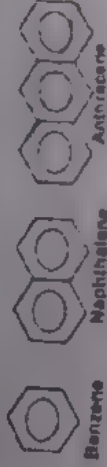
14. Hydrogenation of unsaturated oils is done by using

[2011]

- (A) Finally divided nickel  
(B) Vanadium pentoxide  
(C) Finally divided  
(D) Copper

## Benzene

15. The given three hydrocarbons are: [2015]



- A) Aliphatic hydrocarbons  
B) Aromatic hydrocarbons  
C) Ayclic hydrocarbon  
D) Heterocyclic hydrocarbons

16. When hydrogen atom is remove from benzene, group let is called:

- A) Alkyl group [2010]  
B) Benzyl group  
C) Phenyl group  
D) Methyl group

## Electrophilic substitution reactions of

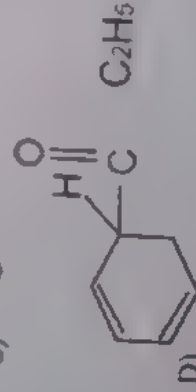
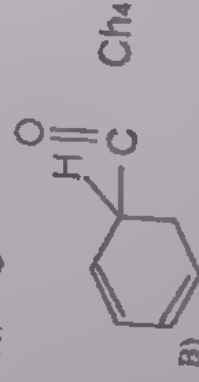
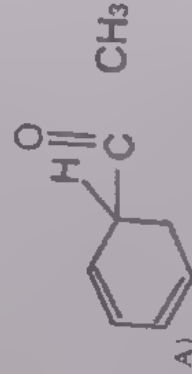
## Benzene

17. Which of the following acts as a electrophile in the electrophilic substitution of benzene with bromine?

- A)  $\text{Br}^+$  [2018]  
B)  $\text{Fe}^{+3}$   
C)  $\text{FeCl}_4^-$   
D)  $\text{Fe}^{+2}$

18. Intermediate product formed when propanoyl chloride react with benzene is:

[2017]



19. When benzene react with Acetyl chloride ( $\text{CH}_3\text{COCl}$ ) is the present of  $\text{AlCl}_3$ , acetophenone is formed. The electrophile in this reaction will be

- A)  $\text{CH}_3\text{C}^+\text{O}$  [2017]  
B)  $\text{AlCl}_3$   
C)  $\text{HNO}_3$   
D)  $\text{HCl}$

20. The reaction of benzene with bromine in the presence of  $\text{FeBr}_3$  follows the mechanism of reaction:

- A) Electrophilic addition [2017]  
B) Nucleophilic substitution  
C) Electrophilic substitution  
D) Nucleophilic addition

21. For halogenation of benzene, which reagent is used:

- A)  $\text{H}_2\text{SO}_4$  [2017-Retake]  
B)  $\text{AlCl}_3$   
C)  $\text{HNO}_3$   
D)  $\text{HCl}$

22. Which one of the following is a powerful electrophile used to attack on the electrons of benzene ring?

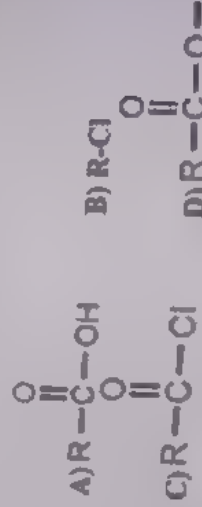
- A)  $\text{FeCl}_3$  [2015]  
B)  $\text{FeCl}_4$   
C)  $\text{Cl}^-$   
D)  $\text{Cl}_2$

23. The introduction of R -C group in benzene is called

- A) Acylation [2012]  
B) Carbonyl reduction  
C) Alkylation  
D) Formylation

24. The introduction of an alkyl group in benzene takes place in the presence  $\text{AlCl}_3$  and:

[2013]



25. Benzene in the presence of  $\text{AlCl}_3$  gives acetophenone when react with:

- A) Acetyl chloride [2011]  
B) Ethyl benzene  
C) Acetic acid  
D) Ethanoic acid

26. The substitution of -H group by  $-\text{NO}_2$  group in benzene is called:

- A) Nitration [2011]  
B) Sulphonation  
C) Ammonolysis  
D) Reduction of benzene

27. The introduction of  $\text{NO}_2$  group in the benzene ring is called nitration. The nitration of benzene takes



by Ali Sudais  
 ethyl chloride  
 etophenone h  
 tion will be:  
 (2017)

amine in the  
 am of  
 (2017)

reagent in  
 7-Retake)

powerful  
 electrons of

[2015]

ne is called  
 [2012]  
 eduction

benzene

[2013]

gives

[2011]

group in

[2011]

ene ring  
 ene takes

www.aliSeries.com.pk  
 when it is heated with a 1:1 mixture  
 at 50-55°C.

[2010]  
 HNO<sub>3</sub> and Conc H<sub>2</sub>SO<sub>4</sub>  
 Conc Acetic acid  
 HNO<sub>3</sub> and conc HCl  
 HNO<sub>3</sub> and Conc H<sub>2</sub>PO<sub>4</sub>  
 nitration of benzene the active nitrating  
 agent is

[2009]  
 B) HNO<sub>3</sub>  
 D) NO<sub>2</sub>

Hydrogenation of Benzene ring  
 side chain oxidation of Methyl Benzene  
 (Toluene) and Ethyl benzene  
 NaNO<sub>2</sub> and NDCAT paper

Benzene ring by 2,4 Directing and 3,5  
 directing group

Which derivative of benzene shows maximum  
 reactivity in electrophilic substitution reactions?

[2019]  
 A) Benzoic acid  
 B) Benzaldehyde  
 C) Nitrobenzene  
 D) Methyl benzene

Which of the following species are 3,5 (meta)  
 directing introduced into the benzene ring: -  
 groups when second group is

[2017]  
 I = -NH<sub>2</sub>  
 II = -CHO  
 III = -COOH  
 IV = -CH<sub>3</sub>  
 A) II, III and IV  
 B) II and III  
 C) I and IV  
 D) I, II and IV

Among the following, which one has electron  
 withdrawing effect:

[2017]  
 A) -NH<sub>2</sub>  
 B) -N(CH<sub>3</sub>)<sub>2</sub>  
 C) -CHO  
 D) -I

Symmetrical alkanes can be produced by:

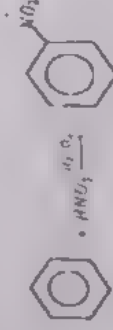
[2010]

A) Sabatier Sendern's reaction  
 B) Hydrogenation reaction  
 C) Electrolytic method  
 D) Reduction reaction  
 Alkanes containing carbon atoms are waxy  
 solids.

[2008]  
 A) Up to 4  
 B) 5 to 17  
 C) more  
 D) None of these

## Key &amp; Hints of Unit 14

1. A
2. B
3. D: Hint: Reactivity order  
Ethyne > Ethyne > Benzene > Ethane
4. B
5. C: Hint:  $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{Br} \xrightarrow{\text{HBr}} \text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
6. D  
Hint:  $\text{CH}_3\text{CH}_2\text{CH}_2 + \text{H}_2\text{OSO}_4\text{H} \xrightarrow{\text{H}_2\text{O}, 100^\circ\text{C}} \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{H}_2\text{SO}_4$
7. C  
A: Hint:  $\text{C}_3\text{H}_7\text{Br} + \text{Alc. KOH} \rightarrow \text{CH}_3\text{CH}=\text{CH}_2 + \text{H}_2\text{SO}_4 + \text{H}_2\text{O}$
8. B  
D: Hint:  $\text{CH}_2=\text{CH}-\text{CH}_3 + \text{HBr} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
9. B
10. D
11. D
12. D: Hint:  $\text{CH}_2=\text{CH}-\text{CH}_3 + \text{HBr} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
13. A
14. A
15. B
16. C: Hint:  $\text{C}_6\text{H}_5 - (\text{Phenyl Group})$
17. A
18. D
19. A: Hint:  $\text{CH}_3\text{COCl} + \text{AlCl}_3 \rightarrow \text{CH}_3\text{CO}^+\text{AlCl}_4^-$
20. C
21. B
22. C
23. A
24. C
25. A
26. A
27. A
28. D
29. D



Hint: Methyl benzene is more reactive than benzene ring

because methyl group is e<sup>-</sup> donating group.

30. B
31. C
32. C
33. C

1. A) Ethane  
C) Ethanol

2. Which of

- A)  $\text{C}-\text{C}$   
C)  $\text{C}-\text{H}$

3. Which of

- A)  $\text{H}-\text{C}-\text{H}$   
C)  $\text{H}-\text{C}-\text{H}$

4. The non

- A) Difluoride  
C) Chloride

5. The IUPAC

- A) 1-Bromo-1,1,1-trichloroethane  
C) 2-Bromo-2,2,2-trichloroethane

6. Organic

- A) Lubricant  
C) Solvent

7. What is

- A) Fluoride  
B) Fluoride  
C) Iodide  
D) Iodide

8. The av

- A) 228  
C) 250

# UNIT 15: Alkyl Halide

Importance of Halogen alkanes.

Haloalkane is a halo derivative of:

- 13) Methane [2018]
- 14) Methanol

Which of the following is the structure of 1-ethanol?

- A)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$  [2018]
- B)  $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_3$
- C)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
- D)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

Which of the following is Haloethane?

[2017]



The non-stick lining of pans is made up from

[2016]

- A) Difluoroethene
- B) Chlorofluoroethene
- C) Chloromethane
- D) Tetrafluoroethene

The IUPAC name of haloethane is

[2014]

- A) 1-Bromo-1-chloro-2,2,2-trifluoroethane
- B) 1,1-Trifluoro-2-bromo-2-chloroethane
- C) 2-Bromo-2-chloro-1,1,1-trifluoroethane
- D) 2-Chloro-2-bromo-1,1,1-trifluoroethane

Organic compound carbon tetra chloride is used as

[2011]

- A) Lubricant
- B) Oxidant
- C) Solvent
- D) Plastic

## Reaction of Alkyl Halides:

What is the order of increasing reactivity of alkyl halide?

[2018]

- 1. Chloroalkane < Chloroalkane < Bromoalkane < Iodoalkane
- 2. Fluoroalkane < Chloroalkane < Bromoalkane < Iodoalkane
- 3. Iodoalkane < Bromoalkane < Chloroalkane < Fluoroalkane
- 4. Fluoroalkane < Bromoalkane < Chloroalkane < Iodoalkane

The average bond energy of C-Br is:

[2016]

- A) 228 kJ/mol
- B) 200 kJ/mol
- C) 250 kJ/mol
- D) 290 kJ/mol

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9. Order of the reactivity of alkenes with hydrogen halide is:

[2015]

- A)  $\text{HBr} > \text{HI} > \text{HCl}$
- B)  $\text{HI} > \text{HBr} > \text{HCl}$
- C)  $\text{HI} > \text{HCl} > \text{HBr}$
- D)  $\text{HCl} > \text{HBr} > \text{HI}$

10. The order for reactivity of alkyl halides towards nucleophile is:

[2013]

- A)  $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$
- B)  $\text{RI} > \text{RBr} > \text{RF} > \text{RCl}$
- C)  $\text{RI} > \text{RBr} > \text{RF} > \text{RCl}$
- D)  $\text{RI} > \text{RF} > \text{RCl} > \text{RBr}$

## F Haluation Reaction

11. In elimination reactions, alcoholic KOH is used.

OH in the case will act as:

[2017]

- A) Electrophile
- B) Base
- C) Leaving group
- D) Alcoholic KOH

15. In elimination reaction \_\_\_ is used:

[2017]

- A) Acidic  $\text{K}_2\text{Cr}_2\text{O}_7$
- B)  $\text{CuCl}$
- C) Acidic NaOH
- D) Alcoholic KOH

12. Consider the reaction given below:

[2016]



Mechanism followed the reaction is:

[2013]

- A) E2
- B) E1
- C) S<sub>N</sub>1
- D) S<sub>N</sub>2

13. Consider the reaction given below:



Which statement is true?

A) Reagent for I is KOH in alcohol

B) Reaction II is elimination

C) Reagent from II is KOH in a. medium

D) Reaction I is Bromination

14. When purely alcoholic solution of sodium/potassium hydroxide and halogen alkanes are refluxed an alkene is formed:

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \xrightarrow{\text{alc. KOH}} \text{CH}_2=\text{CH}_2$

are formed:

[2011]

- A) Elimination
- B) Debromination
- C) Dehydration
- D) Nucleophilic substitution

### Nucleophilic substitution reactions and mechanisms

15. Which product is obtained by the hydrolysis of 1-chlorobutane with the aqueous sodium hydroxide? [2019]

- A) 1-butanol  
B) 1-butene  
C) Butanone  
D) 1-butanol

16. Which of the following acts as a nucleophile in the reaction of alkyl halide with alcoholic / aqueous ammonia?

- A)  $H^+$   
B)  $NO_2$   
C)  $Br^-$   
D)  $NH_3$

17. Which is an intermediate compound in  $S_N1$ : [2017]

- A) Ethoxide ion  
B) halide  
C) Alkene  
D) Carbocation

18. Among the alkyl halides, which always follows  $S_N2$  mechanism: [2017]

- A) Primary alkyl halides  
B) Secondary alkyl halides  
C) Tertiary alkyl halide  
D) Both A & B

19. During the  $S_N1$  reaction, the fast reaction involves: [2016]

- A) Breakage of covalent bond  
B) Formation of carbocation  
C) Transition state  
D) Attack of nucleophile

20.



In the above reaction, the configuration of the product is:

- A) 100% same of the configuration of reactant [2015]  
B) 50% retained  
C) 100% opposite from configuration of reactant  
D) 50% inverted

21. If halogenoalkanes are mixed with an excess of ethanolic ammonia and heated under pressure amine are formed. Which amine is formed in the following reaction?



[2014]

### NUMS and National MDCAT by Ali Series

- A)  $CH_3CH_2NHCH_2CH_3$   
B)  $CH_3CH_2NH_2$   
C)  $CH_3CH_2CH_2NH_2$   
D)  $CH_3CH_2CH_2CH_2NH_2$

22. The alkaline hydrolysis of bromoethane as the product the reagent and the condition used in this reaction may be

- A)  $H_2O$  at room temperature [20...]  
B) Ethanol, heat  
C)  $KOH$  is alcohol  
D) Dilute  $NaOH(aq)$  warm

23. In substitution reaction, dihaloalkane secondary haloalkane give/show:

- A)  $S_N1$  mechanism [2012]  
B)  $S_N2$  mechanism  
C) Both  $E_1$  and  $E_2$   
D) Both  $S_N1$  and  $S_N2$

24. During  $S_N2$  reaction, configuration of alkyl halide molecule is:

- A) Remain same [2017]  
B) Depends upon carbon atom  
C) Gals inverted  
D) Depends upon electronegativity of halide

25. Grignard reagent can be prepared by reaction of magnesium with alkyl halide in the presence of:

[2009]

- A) Sodium lead alloy  
B) Dry ether  
C) Alcohol  
D) Water

13. B  
14. A  
15. A: H

OH

16. D: H  
17. D: H  
18. A  
19. D

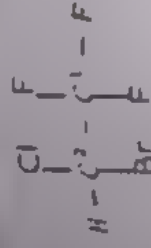
$R_3C^+$  +

20. C  
21. B  
22. D  
23. D



1. A
2. D
3. B
4. D
5. C

6. bromo (chloro-1,1,1) trifluoro ethane



7. C
8. B
9. D



10. D

11. C: Hint: Alkyl iodide shows max reactivity due to the low bond dissociation energy. I2

Reaction I is nucleophile substitution reaction so aq. KOH is required.

Reaction II is elimination reaction so alcoholic KOH is required.

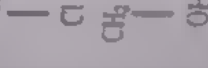
12. B

13. A: Hint: In this reaction primary alkyl halide is converted into an alkene so, its mechanism is E-2.

14. B

15. A

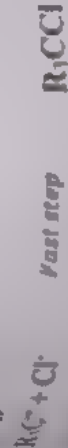
16. A: Hint:  $\text{CH}_2 = \text{CH}_2 + \text{H}_2 + \text{OH} \rightarrow$



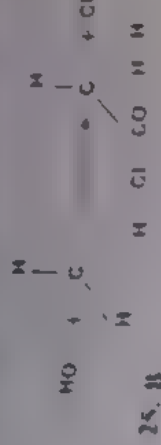
17. D: Hint:  $\text{R} \cdot \text{Cl} + \text{NH}_3 \rightarrow \text{R} \cdot \text{NH}_2 + \text{HCl}$

18. D: Hint:  $\text{R}_3\text{C} \cdot \text{Cl} \rightarrow \text{R}_3\text{C}^+ + \text{Cl}^-$

19. A
20. D



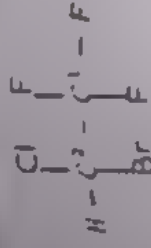
21. C
22. B
23. D



25. B

1. A
2. D
3. B
4. D
5. C

6. bromo (chloro-1,1,1) trifluoro ethane



7. C
8. B
9. D



10. D

11. C: Hint: Alkyl iodide shows max reactivity due to the low bond dissociation energy. I2

Reaction I is nucleophile substitution reaction so aq. KOH is required.

Reaction II is elimination reaction so alcoholic KOH is required.

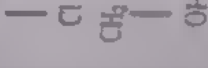
12. B

13. A: Hint: In this reaction primary alkyl halide is converted into an alkene so, its mechanism is E-2.

14. B

15. A

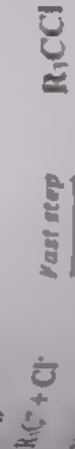
16. A: Hint:  $\text{CH}_2 = \text{CH}_2 + \text{H}_2 + \text{OH} \rightarrow$



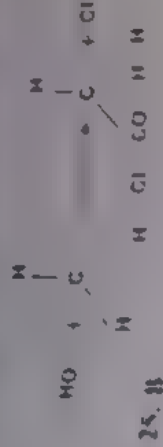
17. D: Hint:  $\text{R} \cdot \text{Cl} + \text{NH}_3 \rightarrow \text{R} \cdot \text{NH}_2 + \text{HCl}$

18. D: Hint:  $\text{R}_3\text{C} \cdot \text{Cl} \rightarrow \text{R}_3\text{C}^+ + \text{Cl}^-$

19. A
20. D



21. C
22. B
23. D



25. B

UNIT 16: Alcohols and phenols

Primary, Secondary and Tertiary

1. Alcohol in which carbon atom bonded to OH group is further attached with three alkyl group: [2018]

A) Aromatic alcohol B) Secondary alcohol  
C) Primary alcohol D) Tertiary alcohol

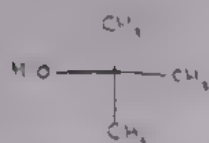
2. Which one the following compound is known as tertiary alcohol? [2018]

A) 2-methyl-1-propanol B) 2-propanol  
C) 2-methyl-2-propanol D) 1-propanol

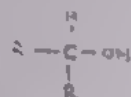
3. Select one which is alcohol. [2018]

A)  $\text{CH}_3\text{OCH}_3$  B)  $\text{CH}_3\text{COOH}$   
C)  $\text{CH}_3\text{CH}_2\text{OH}$  D)  $\text{CH}_3\text{CH}_2\text{Br}$

4. Which of the following is proper classification of the following formula? [2016]



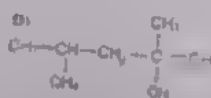
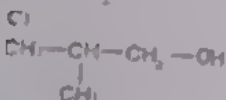
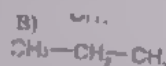
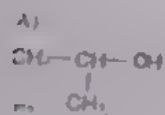
A) Primary B) Secondary  
C) Tertiary D) Polyhydric



5. The following is structure of: [2012]

A) Secondary alcohol B) Primary alcohol  
C) Tertiary alcohol D) Carboxylic acid

6. Which of the following is secondary alcohol? [2011]



7. Choose the correct type for this reaction from the following? [2017]

A) Reduction B) Oxidation  
C) Hydroxylation D) Hydration

8. Which one of the following is NOT able to denature the ethanol? [2017]

A) Methanol  
C) Pyridine

B) Lactic acid  
D) Acetone

9. To produce absolute alcohol (100%) rectified spirit (95.6% alcohol), the remaining 4.4% water must be removed by a drying agent such as:

A) Calcium oxide  
C) Calcium carbonate

B) Calcium chloride  
D) Carbon monoxide

10. Which enzyme is involved in fermentation of glucose

A) Zymase  
C) Invertase

B) Urease  
D) Diastase

11. Methanol is prepared from CO and  $\text{H}_2$ . The catalyst used for this reaction is

A)  $\text{ZnO} + \text{CrO}_2$   
C)  $\text{ZnO} + \text{Cr}_2\text{O}_3$

B)  $\text{ZnO} + \text{CuO}$   
D)  $\text{ZnO} + \text{Ag}_2\text{O}$

12. Concentrated sugar solution undergoes hydrolysis into glucose and fructose by enzyme called

A) Zymase  
C) Cellulase

B) Invertase  
D) Urease

13. The product of the fermentation of a sugar are ethanol and:

A) Water  
C) Carbon dioxide

B) Oxygen  
D) Sulphur dioxide

14. Which of the following reaction is used for the production of alcohol on industrial scale?

A) Hydrogenation alkenes  
B) Hydroxylation alkenes  
C) Hydrohalogenation of alkenes  
D) Hydration of alkenes

Reaction of Alcohols

Preparation of Ethanol

15. Select the reagent X from the following choices for this



A) Acidified phosphoric acid  
B) Acidified Oxalic acid  
C) Acidified potassium hydroxide  
D) Acidified potassium dichromate (VI)

16.  $\text{CH}_3-\text{CH}_2-\text{OH} + \text{PCl}_5 \rightarrow \text{CH}_3-\text{CH}_2\text{Cl} + \text{POCl}_3$  + HCl formation of HCl is test for the presence of in a compound:

A) Alkyl group  
C) Saturated alkyl

17.  $\text{C}_2\text{H}_5\text{OH} + \text{CH}_3\text{I}$  the exact product

A) Diethyl ether  
C) Ethyl acetate  
18. Reaction of alcohol in presence of zinc

A) Ketone  
C) Alkyl Halide  
19. Which one of the following is indication of positive

A) Formation of a brick red precipitate  
20. How will you distinguish ethanol?

A) By Lucas test  
C) By oxidation

21. Primary, secondary and tertiary alcohols are identified and distinguished by

A) Lucas test  
C) Bayer's test

22. Which one of the following is not a method for the formation of alcohols?

A) Methanol  
C) Butanol

23. Which one of the following is not a method for the formation of alcohols when HCl is formed?

A) Amino acid  
C) Halide group

24. The dehydration of concentrated H<sub>2</sub>SO<sub>4</sub> produces

A) Ethene  
C) Alcohol

25. Ethanol can be prepared by

A) Oxidation  
C) Hydration

[2017]  
B) Hydroxyl group  
D) Acid H<sup>+</sup> ion  
H<sup>+</sup> ion  
What will be  
the react product?

[2017]  
B) Methyl propyl ether  
D) Butyl alcohol  
reaction of alcohol with hydrogen chloride in the  
presence of zinc chloride yields \_\_\_\_\_?

[2017]  
B) Carboxylic  
D) Ester  
which one of the following is an appropriate  
identification of positive iodoform test?

[2016]  
B) Release of H<sub>2</sub> gas  
D) Yellow crystals  
A) Formation of H<sub>2</sub>O  
B) Release of H<sub>2</sub> gas  
C) Black red precipitate  
D) Yellow crystals

How will you distinguish between methanol and  
ethanol?

[2015]  
B) By silver mirror test  
D) By iodoform test  
A) Lucas test  
B) By silver mirror test  
C) By oxidation  
Primary, secondary and tertiary alcohol can be  
identified and distinguished by:

[2014]  
B) Iodoform test  
D) Silver mirror test  
A) Lucas test  
B) Iodoform test  
C) Bayer's test  
D) Silver mirror test  
Which one of the following alcohol is indicated by  
formation of yellow crystals in iodoform tests?

[2014]  
B) Ethanol  
D) Propanol  
A) Methanol  
B) Ethanol  
C) Propanol  
D) Butanol  
Which one of the following groups is indicated  
when HCl is formed by reaction of ethanol with  
phosphorus pentachloride?

[2014]  
B) Hydroxyl group  
D) Hydride group  
A) Amino acid  
B) Hydroxyl group  
C) Halide group  
D) Hydride group  
The dehydration of ethyl alcohol with  
concentrated H<sub>2</sub>SO<sub>4</sub> at 140° gives:

[2012]  
B) Diethyl ether  
D) Carboxylic acid  
A) Ethene  
B) Diethyl ether  
C) Alcohol  
D) Carboxylic acid  
Ethanol can be converted in to ethanoic acid by:

[2012]  
B) Fermentation  
D) Hydrogenation  
A) Oxidation  
B) Fermentation  
C) Hydration  
D) Hydrogenation

NUMS and National NDCAT by Ali Sudais  
26. When ethanol is warmed with ethanoic acid in the  
presence of strong acid catalyst, an ester ethyl  
ethanoate is formed;

[2012]  
 $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightarrow \text{C}_2\text{H}_5\text{CO}_2\text{C}_2\text{H}_5$  during  
this reaction  
A) Alcohol is reduced  
B) C - H bond in ethanoic acid is broken  
C) O - H bond in ethanol is broken  
D) Acid is oxidized

27. Consider the following reaction,  
 $\text{C}_2\text{H}_5\text{OH} + \text{PCl}_5 \rightarrow ?$   
what product may be formed?

[2012]  
A) C<sub>2</sub>H<sub>5</sub>Cl, POCl<sub>3</sub> AND HCl  
B) C<sub>2</sub>H<sub>5</sub>Cl only  
C) C<sub>2</sub>H<sub>5</sub>Cl and HCl  
D) C<sub>2</sub>H<sub>5</sub>Cl and POCl<sub>3</sub>

28. An alcohol is converted into an aldehyde with same  
number of carbon atoms in the presence of K<sub>2</sub>CrO<sub>4</sub>  
/ H<sub>2</sub>SO<sub>4</sub>, the alcohol is;

[2011]  
A) CH<sub>3</sub>C(CH<sub>3</sub>)OH  
B) (CH<sub>3</sub>)<sub>3</sub>COH  
C) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH  
D) (CH<sub>3</sub>)<sub>2</sub>CHOH  
29. Ethanol reacts with ammonia to form ethyl amine.  
The catalyst used for this reaction is;

[2010]  
A) ZnCl<sub>2</sub>  
B) C<sub>2</sub>H<sub>5</sub>N  
C) ThO<sub>2</sub>  
D) Cr<sub>2</sub>O<sub>3</sub>  
30. Which bond will break when electrophile attacks  
an alcohol?

[2008]  
A) O - H  
B) C - O  
C) Both A & B  
D) None of these

# Reactions of Phenol

31. Which of the following compound is solid at room  
temperature?

[2018]  
A) Ethanol  
B) Methanol  
C) Butane  
D) Phenol  
32. Sodium phenoxide on treat in with hydrochloric  
acid yields:

[Re take 2017]  
A) Benzene  
B) Benzoic acid  
C) Phenol  
D) Benzaldehyde  
33. At 25°C with phenol 2-4 dinitrophenol is formed  
by the reaction of:

[2017]  
A) (HNO<sub>3</sub> + H<sub>2</sub>SO<sub>4</sub>) with benzene  
B) (HNO<sub>3</sub> + H<sub>2</sub>SO<sub>4</sub>) with phenol



C) NaOH with benzene sulphonic acid

D) Sodium phenoxide with HCl

34. Which one of the following was used as one of the earliest antiseptic and disinfection? [2016]

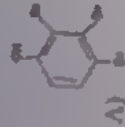
A) Phenol

B) Ether

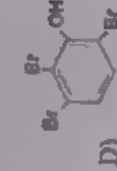
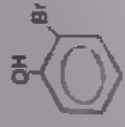
C) Ethanol

D) Methanol

35. Which one of the following is an appropriate structure of product of Brominating of phenol? [2015]

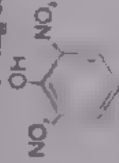


B)



D)

36. Which one of the following is an appropriate name of following compound? [2016]



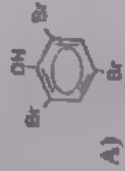
A)

B) M-nitrophenol

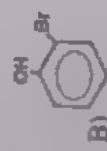
C) Tartaric acid

D) Picric acid

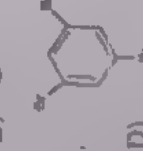
37. Aqueous phenol decolorizes bromine water to form a white precipitate, what is the structure of the white precipitate formed? [2014]



B)

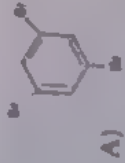


C)

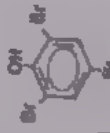


D)

38. The formula of 2,4,6-tribromophenol is: [2014]



B)

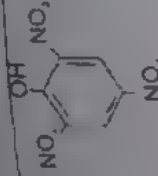


C)



D)

39. The name of a below structure is: [2013]



A) Nitro phenol

C) Malonic acid

B) Benzoic acid

D) Picric acid

40. Dissociation constant of phenol is:

A)  $1.2 \times 10^{-10}$

[2016]

C)  $1.2 \times 10^{-10}$

D)  $1.3 \times 10^{-10}$

41. Which acid is used in the manufacturing of plastics?

A) Carboic acid

[2009]

C) Carbonic acid

B) Acetic acid

D) Oxalic acid

42. Phenol reacts with concentrated  $H_2SO_4$  to give:

A) Ortho hydroxyl benzene sulphonic acid

[2009]

B) Meta hydroxyl benzene sulphonic acid

C) Ortho and para Hydroxy benzene sulphonic acid

D) Para hydroxyl benzene sulphonic acid

43. Phenol can be distinguished from alcohol by adding:

A)  $Br_2 / H_2O$

[2009]

C)  $FeSO_4$

B)  $Cl_2 / H_2O$

D)  $FeCl_3$

Acidity of water, ethanol and phenol

44. The acidity of phenol is due to its \_\_\_\_\_

A) Nature of benzene

[2018]

B) Double bond in benzene ring

C) Nature of phenoxide

D) Hydroxyl group

45. Alcohol react slowly with Na-metal as compared to water because it has low concentration of  $H^+$  ions which suggest it is:

A) Less acidic than water

[2017]

B) Less basic than phenol

C) More acidic than phenol

D) More acidic than water

46. Phenoxide ion is more stable than Ethoxide ions

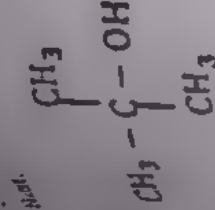
[2017]

A) Lone pair on oxygen atom overlap with  $\pi$  delocalized pi-bonding system in benzene

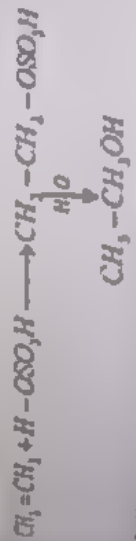
B) Oxygen atom is directly bonded with benzene ring in phenoxide ion

C) The negative charge is localized on oxygen atom of phenoxide ion

D) The negative charge is delocalized on oxygen atom of Ethoxide ion

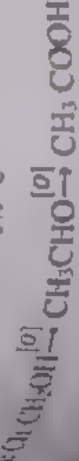
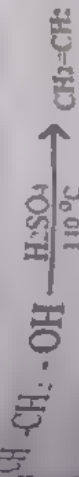
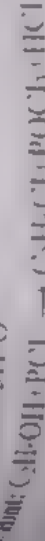
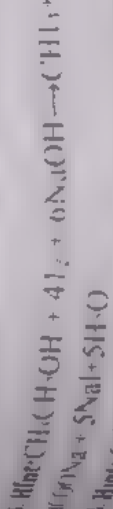


Hint: Iso propyl alcohol or 2-propanol is a secondary alcohol because carbon atom attached with two methyl groups



Hint: Yellow precipitate due to the  $\text{CH}_3\text{I}$

Hint: Ethano. shows iodoform test but methanol not



NUMS and National NDCAT by Ali Sudais

26. C: Hint: In this reaction  $\text{O} - \text{H}$  bond is broken in alcohol because it is electrophilic substitution reaction with respect to alcohol

27. A: Hint:  $\text{C}_2\text{H}_5\text{OH} + \text{PCl}_5 \longrightarrow \text{C}_2\text{H}_5\text{Cl} + \text{POCl}_3 + \text{HCl}$

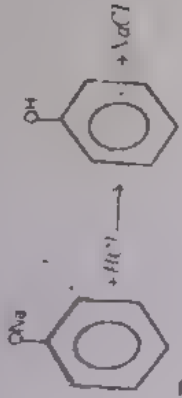
28. C: Hint: Primary Alcohol  $\rightarrow$  Aldehyde

29. C

30. A: Hint: In electrophilic substitution reaction an  $\text{E}^+$  displaces  $\text{H}$  atom so  $\text{O} - \text{H}$  bond is broken

31. D: Hint: Phenol is a solid and its melting point is  $41^\circ\text{C}$ .

32. C



33. B

34. A

Hint: Phenol is poisonous substance so it is used as a disinfectant in hospitals and washrooms.

35. C

36. D

37. D

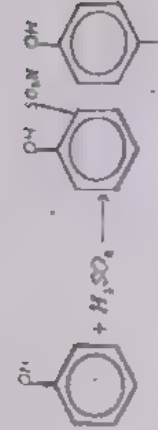
38. B

39. D

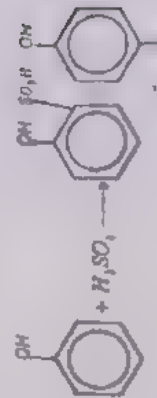
40. D

41. A

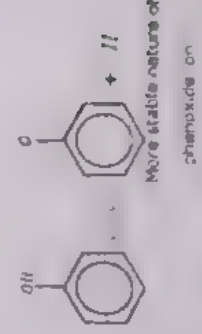
42. C



43. A



44. C



45. A: Hint: Mineral Acids Carboxylic acid + water + phenol + Alcohol

46. A

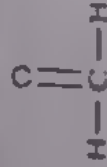
## UNIT 17 Aldehyde and Ketone

## Structure of Aldehydes and Ketones:

1. Which of the following compounds will give a secondary alcohol after reaction with  $\text{NaBH}_4$ ? [2019]

- A)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$   
 B)  $\text{CH}_3\text{COCH}_3$   
 C)  $\text{CH}_3\text{CH}_2\text{COOH}$   
 D)  $\text{CH}_3\text{CH}_2\text{CHO}$

2. Which one the following is IUPAC name of the above given structure: [2016]

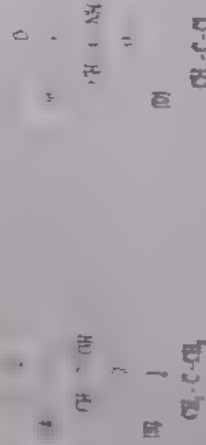


- A) Propanaldehyde  
 B) Methanone  
 C) Acetaldehyde  
 D) Methanal

3. Both aldehydes and ketones are planar to the neighborhods of carbonyl (C=O) group. Which one of the following bonds is distorted towards the oxygen atoms? [2015]

- A)  $\pi$ -bond of C and O  
 B) Sigma bond of C and O  
 C) Sigma bond of C and H  
 D) Sigma bond of C and C

4. Which of the following is the structure of a ketones? [2013]



5. Which of the following compounds belong to homologous series of aldehydes [2011]

- A)  $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{Cl} \end{array}$   
 B)  $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{C} \end{array}$   
 C)  $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{NH} \end{array}$   
 D)  $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{OH}-\text{NH} \end{array}$

## NUMS and National MDCAT by Ali Series

## Preparation of Aldehydes and Ketones

6. Why is it necessary to distill aldehyde formed in oxidation of or, alcohol through acidic potassium dichromate (VI) solution on or acid sodium dichromate (VI) solution [2019]

- A) Aldehyde formed is unstable and decomposes to original precursor, i.e. primary alcohol  
 B) Aldehyde formed may react with primary alcohol the original reactant.

- C) Aldehyde may be oxidized further to a ketone  
 D) Aldehyde formed may be oxidized further to carboxylic acid

7. Ketones can be made by oxidation of

- A) Secondary Alcohols  
 B) Tertiary Alcohols  
 C) Aldehydes  
 D) Primary Alcohols

8. In the reaction, "x" represents which one of the following products: [2017]



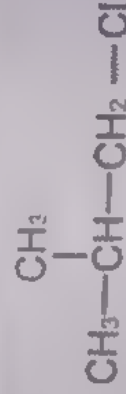
## Ketone

- A) Aldehyde  
 B) Aldehyde  
 C) Formic acid  
 D) Ether

9. 2-propanol on Oxidation give : [2017-Retake]

- A) Aldehyde  
 B) Ketone  
 C) Carboxylic acid  
 D) Alcohol

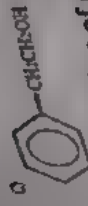
10.  $\text{Na}_2\text{Cr}_2\text{O}_7$ , what the product will be, when secondary alcohols are oxidized in such conditions? [2011]



- A) Alkenes  
 B) Alkynes  
 C) Alkyl halides  
 D) Ketones

11. A student mixed ethyl alcohol with small amount of sodium dichromate and added it to the solution of dilute Sulphuric acid. A vigorous reaction took place. He distilled the product formed immediately. What was the product? [2014]

- A) Acetone  
 B) Acetic acid  
 C) Dimethyl ether  
 D) Acetaldehyde
12. What is the structure of alcohol which on oxidation with acidified  $\text{Na}_2\text{Cr}_2\text{O}_7$  gives ketone? [2014]



13. Dry distillation of malic acid and formic acid gives

- A) Acetaldehyde  
 B) Acetic acid  
 C) Calcium acetate  
 D) In the conversion of cupric chloride to cuprous chloride

- A) Initiator  
 C) Catalyst

15. Aldehydes can be used as

- A) Primary alcohols  
 C) Organic acids

## Reactions of Aldehydes

16. In the conversion of cupric chloride to cuprous chloride

- A) Initiator  
 C) Catalyst

17. Which compound is used in the oxidation of ethanol to ethanal

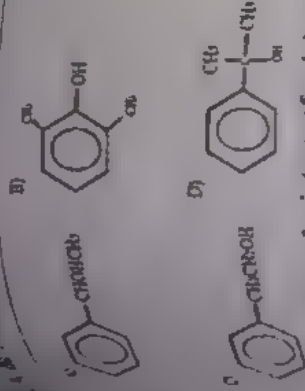
- A) Ethanol  
 C) Ethanoic acid

18. Which one of the following is not a test for aldehydes

- A) Tollen's reagent  
 C) Propanal

19. What will be the product of the reaction of ethanal with HCN





13. Distillation of mixture of calcium salts of acetic acid and formic acid results into formation of :

- A) Acetaldehyde [2010]  
 B) Formaldehyde  
 C) Sodium acetate  
 D) Sodium acetate

14. In the conversion of ethylene into acetaldehyde, cupric chloride acts as

- A) Initiator [2009]  
 B) Promoter  
 C) Reactant  
 D) Reactant

15. Aldehydes can be synthesized by the oxidation of

- A) Primary alcohols [2008]  
 B) Secondary alcohols  
 C) Organic acids  
 D) Inorganic acids

#### Reactions of Aldehydes and Ketones:

16. In the conversion of ethylene into acetaldehyde, cupric chloride acts as

- A) Initiator [2009]  
 B) Promoter  
 C) Catalyst  
 D) Reactant

17. Which compound will be produced by the oxidation of ethanol by acidified  $K_2Cr_2O_7$ ?

- A) Ethanone [2018]  
 B) Ethene  
 C) Ethanoic acid  
 D) Ethanol

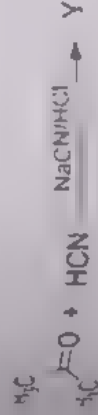
18. Which one of the following compounds will give iodoform test on treatment with aqueous iodine?

[2017]

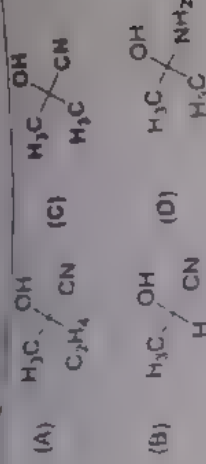
- A) Acetone  
 B) Propanone  
 C) Propanal  
 D) Butanal

19. What will be the product of the reaction given below:

[2017]



#### NUMS and National MDCAT by Ali Sudais



20. Which reagent is responsible for the conversion of ketone to secondary alcohol

[2017-Retake]

- A)  $NaAlH_4$   
 B)  $NaBH_4$   
 C) Al  
 D) Red P

21. Both aldehyde and Ketones give \_\_\_\_\_?

[2017-Retake]

- A) Tollen's Test  
 B) 2, 4-DNPH test  
 C) Benedict's solution test  
 D) Sodium nitroprusside test

22. Identify the compound, which give Iodoform test:

[2017]

- A) Methanol  
 B) Methyl ketone  
 C) 3 - Hexanol  
 D) Propionaldehyde

23. Which one of the following tests is given by both aldehyde and ketone?

[2016]

- A) Silver mirror test  
 B) Fehling's solution test  
 C) 2,4 DNPH test

D) Benedict's solution test

24.  $R-CH=N-NH-C_6H_4(NO_2)_2$ :

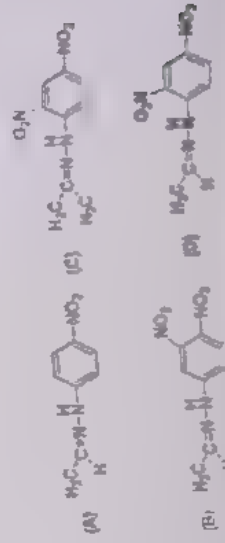
[2014]

It is a general formula of:

- A) 2,4 dinitrophenyl hydrazine  
 B) Phenyl hydrazine  
 C) 1,3 dinitrophenylhydrazine  
 D) 2, 4 dinitrophenylhydrazine

25. When acetaldehyde reacts with 2,4-dinitrophenylhydrazine (2,4 DNPH), which one of the following product is formed

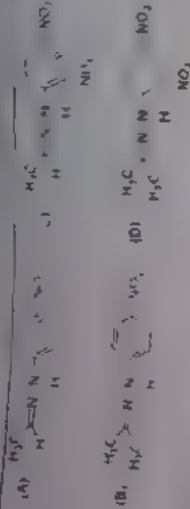
[2015]



26. The structure of formula of the product of reaction of acetone with 2, 4-dinitrophenyl hydrazine is

[2014]





27. For the reaction:



- A)  $\text{CH}_3\text{COCH}_3$   
 B)  $\text{CH}_3\text{C}(\text{OH})(\text{CN})\text{CH}_3$   
 C)  $\text{CH}_3\text{C}(\text{OH})\text{CH}_3$   
 D)  $\text{CH}_3\text{C}(\text{CN})\text{CH}_3$

28. Which group gives a yellow precipitate of triiodomethane when warmed alkaline aqueous iodine?

- (A) An amide group,  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{NH}_2$   
 (B) Ethyl ketone group,  $\text{C}_2\text{H}_5-\text{C}(=\text{O})-\text{NH}_2$   
 (C) A primary alcohol group as in propanol,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$   
 (D) Methyl ketone group,  $\text{CH}_3-\text{C}(=\text{O})-\text{CH}_3$

29. Formaldehyde reacts with HCN ( $\text{NaCN} + \text{HCl}$ ) to give a compound

- (A)  $\text{H}_3\text{C}-\text{CH}(\text{OH})-\text{CN}$   
 (B)  $\text{H}_3\text{C}-\text{C}(\text{OH})(\text{CN})_2$   
 (C)  $\text{H}_3\text{C}-\text{C}(\text{OH})_2-\text{CN}$   
 (D)  $\text{H}_3\text{C}-\text{C}(\text{OH})(\text{CN})-\text{CN}$

30. Iodoform test will not be positive with

- (A)  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_3$   
 (B)  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_2-\text{CH}_3$   
 (C)  $\text{C}_2\text{H}_5\text{OH}$   
 (D)  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{CH}_3$



- (A)  $\text{CN}^-$   
 (B)  $\text{HCl}$   
 (C)  $\text{Cl}^-$   
 (D)  $\text{OH}^-$

32. When acetone is heated in the presence of  $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4$ , the products formed are;

- (A) Maleic Acid and Fumaric Acid  
 (B) Acetic Acid and Formic Acid

- (C) Formic Acid and Oxalic Acid  
 (D) Oxalic Acid and Acetic Acid

Nucleophilic addition reaction mechanism

33. Which type of reaction takes place when a carbonyl compound is treated with the mixture of  $\text{NaCN}$  and an acid?

- (A) Substitution reaction  
 (B) Electrophilic addition reaction  
 (C) Nucleophilic addition reaction  
 (D) Displacement reaction

34. Which mechanism of reactions is shown in carbonyl compounds?

- (A) Electrophilic substitution  
 (B) Electrophilic addition  
 (C) Free radical substitution  
 (D) Nucleophilic addition

35. The reaction of aldehydes and ketones with ammonia derivative  $-\text{G}-\text{NH}_2$  to form compounds containing the group

$\text{C}=\text{N}-\text{C}$  and water, this reaction is known as \_\_\_\_\_ reaction.

- (A) Nucleophilic addition  
 (B) Nucleophilic substitution  
 (C) Electrophilic addition  
 (D) Addition elimination

36. Ethanal reacts with  $\text{HCN}$  to form cyanohydrin. It is an example of:

- (A) Nucleophilic addition  
 (B) Electrophilic addition  
 (C) Electrophilic substitution  
 (D) Nucleophilic substitution

Reaction with weak oxidizing agent

37. Which of the following will give a positive test with Tollen's reagent?

- (A) Aldehydes  
 (B) Tertiary alcohols  
 (C) Tertiary alcohols  
 (D) Carboxylic acids

38. Identification tests for functional groups of organic compounds are associated with specific observations. Tollen's reagent is ammoniacal silver nitrate solution, which is used for the identification of a functional group X with an observation O. Identify X and O.

- (A)  $\text{CH}_3\text{COOH}$   
 (B)  $\text{CH}_3\text{CHO}$   
 (C) Brick red precipitate  
 (D) Reacts with

- A) Sodium borohydride  
B) Sodium disulphate  
C) Fehling's solution  
D) Formaldehyde

120191

- 181021

[2017 Retake]

- Share**

Consider the following reaction:



- new tests

4.  $\text{Na}_2\text{Cr}_2\text{O}_7$ , what the product will be, when secondary alcohols are oxidized in same conditions?

- [2011]

4. By Distillation of mixture of calcium salts of acetic acid and formic acid results into formation of:

- [2010]

## Editorial

- [2005]

Which of the following compounds will react with Tollen's Reagent?

- 160071

alkali with precipitates are formed when aldehyde

2007

## Key &amp; Hints of Unit 17

1. B  $\text{CH}_3\text{COX} \xrightarrow{\text{NaOH}} \text{CH}_3\text{CH}(\text{OH})\text{X}$   
 2. D



3. A  
**Pi bond of carbonyl group is distorted towards oxygen due to its high electronegativity**  
 4. B  
 5. B  
 6. D: Hint: Immediate distillation is required otherwise aldehyde further oxidized into carboxylic acid  
 7. A  
 8. B  
 9. B

(O)]



10. D: Hint: Secondary Alcohol  $\xrightarrow{\text{NaCr}_2\text{O}_7 \cdot \text{H}_2\text{SO}_4}$  Ketones  
 11. D

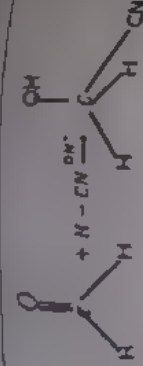


12. C  
 **$\text{PdCl}_2$  only catalyst**  
 **$\text{CuCl}_2$  promoter**  
 13. A Hint: Primary Alcohol  $\rightarrow$  Aldehyde  
 14. C  
 15. C Hint:  $\text{CH}_3\text{CHO} \xrightarrow{[\text{O}]} \text{CH}_3\text{COOH}$   
 16. B Primary Alcohol  $\xrightarrow{[\text{O}]}$  Aldehyde  $\xrightarrow{[\text{O}]}$  Carboxylic Acid  
 17. C

18. B  
 19. B  
 20. B  
 21. C  
 22. D  
 23. D  
 24. D  
 25. A  
 26. B  
 27. B  
 28. A

Hint: only methyl ketones show Iodoform test.

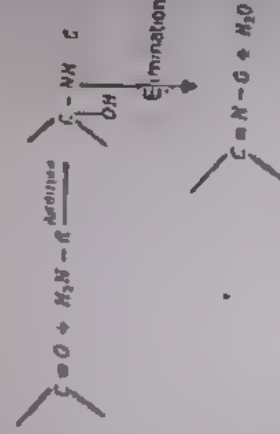
29. A



30. B  
 31. C  
 32. D



33. D  
 34. A  
**Hint: Carbonyl compounds show Nu addition reaction.**  
 35. A



36. C

Hint: Aldehyde Tollen's reagent  $\xrightarrow{\text{Appearance}}$  ppt of Ag

37. A  
 38. B  
 39. D

Hint: When Aliphatic aldehyde react with Fehling solution or Benedict's solution they give brick red precipitate of  $\text{Cu}_2\text{O}$ .

40. D  
 41. A  
 42. C  
 43. B

Hint: All aldehyde show Tollen's reagent test or silver mirror test

44. C

## Physical Properties

The dilute solution

A) Formic Acid

B) Acetic Acid

C) Acetic acid is

D) Acetic acid is

A) Methanone

B) Ethanol

C) Preparation

D) Nitriles (RCN)

mineral acid

A) Ethers

B) Alcohol

C) Compound

D) Compound

A) Cyano group

B) Carbon group

C) Nitro group

D) Nitriles

Which one is

O

(A) C

(B) -C-

Final product

A) Ketone

B) Alcohol

C) Alcohol

D) Alcohol

A) HCOOC

B) HCOOC

C) HCOOC

D) HCOOC

Acetamide

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A) HCOOC

B) HCOOC

C) HCOOC

D) HCOOC

Acetamide

229 Page

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NUMS and National MDCAT by All Series

A) HCOOC

B) HCOOC

C) HCOOC

D) HCOOC

Acetamide

229 Page

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UNIT 18 Carboxylic Acid

Physical properties of carboxylic acids

The dilute solution of \_\_\_\_\_ is called vinegar;

[2018]

- A) Formic Acid  
B) Benzoic Acid  
C) Acetic Acid  
D) Oxalic Acid

Acetic acid is called \_\_\_\_\_ acid.

[2008]

- A) Methanoic  
B) Propanoic  
C) Ethanoic  
D) Butanoic

Preparations of Carboxylic Acid

Nitriles (RCN) on hydrolysis in the presence of a mineral acid yield

[2019]

- A) Esters  
B) Carboxylic Acid  
C) Alcohol  
D) Aldehydes

Compound having  $-C \equiv N$  group are called

[2017]

- A) Cyano compound  
B) Carbon nitrogen molecules  
C) Nitro compound  
D) Nitriles

Which one is a functional group of carboxylic acid:

[2017]

- (A)  $-\overset{\overset{O}{\parallel}}{C}-$   
(B)  $-\overset{\overset{O}{\parallel}}{C}-O-$   
(C)  $-\overset{\overset{O}{\parallel}}{C}-O-$   
(D) None of these

Final product of hydrolysis of nitrile yield:

[2017-Retake]

- A) Ketone  
B) Aldehyde  
C) Alcohol  
D) Carboxylic acid



Which one is  $\alpha$ -carbon atom

[2015]

- A) 1  
B) 3  
C) 2  
D) 4

An organic acid 'Z' reacts separately with sodium bicarbonate, sodium hydroxide and sodium carbonate. Which one of the following represent the structure of 'Z'.

[2015]

- A)  $\text{HCOOCH}_3$   
B)  $\text{CH}_3-\text{CH}=\text{CH}_2$   
C)  $\text{CH}_3\text{CH}_2\text{OH}$   
D)  $\text{H}_3\text{C}-\text{CH}_2-\text{COOH}$

Amide is formed by the of ammonia with

[2015]

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[2014]

- A) Oxalic Acid  
B) Tartaric Acid  
C) Butanoic Acid  
D) Propanoic Acid

10. Methyl cyanides, on boiling with mineral acids or alkalis yield:

[2013]

- A) Butanoic acid  
B) Acetic Acid  
C) Formic Acid  
D) Propanoic Acid

11. When  $\text{CH}_3\text{CH}_2\text{OH}$  is oxidized in the presence of  $\text{K}_2\text{Cr}_2\text{O}_7$  and  $\text{H}_2\text{SO}_4$ , the product formed is

[2012]

- (A)  $\text{H}_3\text{C}-\overset{\overset{O}{\parallel}}{\text{C}}-\text{OH}$   
(B)  $\text{H}-\overset{\overset{O}{\parallel}}{\text{C}}-\text{OH}$   
(C)  $\text{H}_3\text{C}-\overset{\overset{O}{\parallel}}{\text{C}}-\text{CH}_3$   
(D)  $\text{H}_3\text{C}-\overset{\overset{O}{\parallel}}{\text{C}}-\text{OCH}_3$

12. Hydrolysis of cyano group by an aqueous acid result into:

[2010]

- A) Acid amide  
B) Carboxylic acid  
C) Cyano hydride  
D) Formaldehyde

13. Which of the following compounds in the form of aqueous ion will produce  $\text{CO}_2$  on reaction with sodium carbonate:

[2010]

- A)  $\text{CH}_3\text{COOC}_2\text{H}_5$   
B)  $\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5$   
C)  $\text{C}_2\text{H}_5\text{COOCH}_3$   
D)  $\text{C}_2\text{H}_5\text{COOH}$

14.  $\text{CH}_3\text{CN} + \text{HCl} \longrightarrow \text{A} + \text{B}$  in presence of water in the above reaction A and B are

[2010]

- A) Acetic acid and acid amide  
B) Acetic acid and methyl chloride  
C) Acetic acid and ammonia  
D) Acetic acid and ammonium chloride

Reactions of carboxylic acids

15. Which of the following reagent is required for preparation of acyl chloride ( $\text{CH}_3\text{COCl}$ ) from ethanoic acid?

[2019]

- A)  $\text{POCl}_3$   
B)  $\text{HCl}$   
C)  $\text{PCl}_5$   
D)  $\text{CH}_3\text{Cl}$

16. Carboxylic acids can be reduced into corresponding alcohols. Which following reagent can be used for this purpose?

[2019]

- A)  $\text{LiAlH}_4$   
B)  $\text{K}_2\text{Cr}_2\text{O}_7$   
C)  $\text{KMnO}_4$   
D)  $\text{H}_2\text{SO}_4$

17. Which balanced chemical equation shows the formation of ethanoyl chloride using thionyl chloride?



- [2019]
- A)  $\text{CH}_3\text{COOH} + \text{SOCl}_2 \xrightarrow{+\text{SO}_2 + \text{HCl}} \text{CH}_3\text{COCl}$   
 B)  $\text{C}_2\text{H}_5\text{COOH} + 2\text{SOCl}_2 \xrightarrow{+\text{SO}_2 + \text{HCl}} \text{C}_2\text{H}_5\text{COCl} + \text{C}_2\text{H}_5\text{COCl}$   
 C)  $\text{C}_2\text{H}_5\text{COOH} + 2\text{SOCl}_2 \xrightarrow{+\text{SO}_2 + \text{HCl}} \text{C}_2\text{H}_5\text{COCl}$   
 D)  $\text{HCOOH} + \text{SOCl}_2 \xrightarrow{+\text{HCl}} \text{HCOCl} + \text{SO}_2 + \text{HCl}$

18. Which product is formed by the reaction of carboxylic acid with alcohol?

[2018]

- A) Ester  
 B) Alkane  
 C) Aldehyde  
 D) Ether

19. Which one of the following compounds act as catalyst when alcohols react with carboxylic acids?

[2018]

- A) Pt  
 B) conc.  $\text{H}_2\text{SO}_4$   
 C) Ni  
 D) conc.  $\text{HNO}_3$

20. Which one will be act as a strong acid?

[2018]

- A) Dichloroethanoic acid  
 B) Trichloroethanoic acid  
 C) Ethanoic acid  
 D) Chloroethanoic acid

21. Identify the product X in the following reaction:



22. During esterification, the bond from alcohol that break is between \_\_\_\_\_:

[2017 Retake]

	X	Y	Z
A)	Alcohol	Ester	Acetic Acid
B)	Alcohol	Ester	Mineral Acid
C)	Alcohol	Acetic Acid	Ester
D)	Alcohol	Mineral Acid	Ester

- A) Carbon and Oxygen  
 B) Oxygen and hydrogen  
 C) Carbon and carbon  
 D) None of these

23.  $\text{H}_3\text{COOH} + \text{CH}_3\text{CH}_2\text{OH} \rightleftharpoons \text{H}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$   
 Which one of the following will act as a catalyst in above reaction?

- A)  $\text{HNO}_3$   
 B) Acidified potassium dichromate

[2016]

- C)  $\text{H}_2\text{SO}_4$   
 D)  $\text{SOCl}_2$

24.  $\text{CH}_3\text{COOH} + \text{PCl}_5 \longrightarrow ?$   
 Which one of the following options shows products of above reaction?

- A)  $\text{POCl}_3 + \text{CH}_3\text{COCl} + \text{HCl}$   
 B)  $\text{CH}_3\text{COCl} + \text{POCl}_3 + \text{HCl}$   
 C)  $\text{POCl}_3 + \text{CH}_3\text{COCl} + \text{H}_2$   
 D)  $\text{POCl}_3 + \text{CH}_3\text{COCl} + \text{HCl}$

25. Which one of the following reactions of carboxylic acid is reversible?

- A) Esterification  
 B) Reaction with  $\text{SO}_2$   
 C) Salt formation  
 D) Reaction with  $\text{PCl}_5$
26. Select the correct acidic strength order of chlorosubstituted acids"

- A)  $\text{CH}_3\text{COOH} > \text{ClCH}_2\text{COOH} > \text{Cl}_2\text{CHCOOH} > \text{Cl}_3\text{CCOOH}$   
 B)  $\text{CH}_3\text{COOH} > \text{Cl}_2\text{CHCOOH} > \text{ClCH}_2\text{COOH} > \text{Cl}_3\text{CCOOH}$   
 C)  $\text{Cl}_3\text{CCOOH} > \text{Cl}_2\text{CHCOOH} > \text{ClCH}_2\text{COOH} > \text{CH}_3\text{COOH}$   
 D)  $\text{Cl}_3\text{CCOOH} > \text{CH}_3\text{COOH} > \text{Cl}_2\text{CHCOOH} > \text{ClCH}_2\text{COOH}$

27. Carboxylic acids are rather hard to reduce, which powerful reducing agent can be used to convert them to the corresponding primary alcohol

[2015]

- A)  $\text{H}_2\text{SO}_4/\text{HgSO}_4$   
 B)  $\text{V}_2\text{O}_5$   
 C)  $\text{LiAlH}_4$   
 D)  $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4$

28. Ethyl butyrate and butyl butanoate are esters with the flavor of

[2014]

- A) Pear  
 B) Banana  
 C) Pineapple  
 D) Apple

29. Organic compound 'X' and 'Y' both can react with Na-metal to evolve hydrogen gas. 'X' and 'Y' react with each other form an organic compound 'Z' which gives fruity smell. What type of compounds 'X', 'Y' and 'Z' are?

[2014]

30. The formation of ester from acetic acid is process of acid and ethanol is a:

[2014]

- A) Nucleophilic addition reaction  
 B) Electrophilic substitution reaction  
 C) Nucleophilic substitution reaction  
 D) Electrophilic addition reaction

When ethanoyl chloride reacts with methylamine, an amide is formed. What is the structure of the amide formed?

- (A)  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{NH}_2$  (B)  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{NHCH}_3$   
 (C)  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{NH}$  (D)  $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{NHCH}_2\text{CH}_3$

[2012]



- (A)  $\text{CH}_3\text{COONH}_2 + \text{H}_2\text{O}$  (B)  $\text{CH}_3\text{COONH}_2 + \text{H}_2$   
 (C)  $\text{CH}_3\text{COONH}_2 + \text{HCl}$  (D)  $\text{CH}_3\text{COONH}_2 + \text{H}_2\text{O}$

Consider the following reaction,  $\text{CH}_3\text{COOH} + \text{PCl}_5 \longrightarrow \text{H}_3\text{C}-\text{COCl} + \text{POCl}_3 + \text{HCl}$ . In the above reaction the nucleophile which attacks on the carbon atom is:

- (A)  $\text{OH}^-$  (B)  $\text{P}$   
 (C)  $\text{Cl}^-$  (D)  $\text{H}^+$

[2012]

34.  $\text{CH}_3\text{COOH} + \text{PCl}_5 \longrightarrow$  the products of above reaction are

- (A)  $\text{CH}_3\text{COCl} + \text{POCl}_3 + \text{HCl}$   
 (B)  $\text{CH}_3\text{COCl} + \text{POCl}_3 + \text{HCl}$   
 (C)  $\text{CH}_3\text{Cl} + \text{POCl}_3 + \text{HO}$   
 (D)  $\text{CH}_3\text{COCl} + \text{POCl}_3 + \text{H}_2$

[2011]

35. Consider the following reaction,  $\text{CH}_3\text{COOH} + \text{Mg} \longrightarrow ?$

- What product will form  
 (A) Magnesium formate  
 (B) Magnesium acetate  
 (C) Magnesium ion  
 (D) Carboxylate ion

[2011]

36. Relative acidic strength of alcohol, phenol and carboxylic acid is:

- (A) Carboxylic acid > alcohol > phenol > water  
 (B) Carboxylic acid > phenol > water > alcohol  
 (C) Phenol > Carboxylic acid > alcohol > water  
 (D) Water > phenol > alcohol > carboxylic acid

[2011]

Acid	$K_a$
$\text{CH}_3\text{COOH}$	$1.8 \times 10^{-5}$
$\text{C}_6\text{H}_5\text{COOH}$	$2.3 \times 10^{-5}$
$\text{HClO}_4$	$5.0 \times 10^{-10}$

37. The order of acidic strength is:

- (A)  $\text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{COOH} > \text{HClO}_4$   
 (B)  $\text{HClO}_4 > \text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{COOH}$   
 (C)  $\text{C}_6\text{H}_5\text{COOH} > \text{CH}_3\text{COOH} > \text{HClO}_4$   
 (D)  $\text{HClO}_4 > \text{C}_6\text{H}_5\text{COOH} > \text{CH}_3\text{COOH}$

[2011]

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$\text{CH}_3\text{COOH}$   $1.3 \times 10^{-5}$

The order of acid strength is

- (A)  $\text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{COOH} > \text{CH}_3\text{COOH}$   
 (B)  $\text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{COOH} > \text{CH}_3\text{COOH}$   
 (C)  $\text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{COOH} > \text{CH}_3\text{COOH}$   
 (D)  $\text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{COOH} > \text{CH}_3\text{COOH}$

## Key &amp; Hints of Unit 18

1. C: Hint: Vinegar solution contains 5 - 8 % acetic acid.

2. C

3. B: Hint:  $\text{CH}_3\text{CN} + \text{HCl}_{(aq)} \rightarrow \text{CH}_3\text{COOH} + \text{NH}_4\text{Cl}$

4. D

5. A

6. D: Hint:  $\text{R-CN} + \text{H}_2\text{O} \rightarrow \text{R-COOH}$

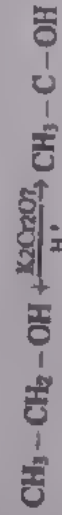
7. C: Hint: Second carbon is an  $\alpha$ -carbon because it is attached with carboxylic acid.

8. D: Hint: Carboxylic acid reacts with sodium carbonate and sodium hydroxide and sodium bicarbonate.

9. B: Hint:  $\text{CH}_3\text{COOH} + \text{NH}_3 \rightarrow \text{CH}_3\text{COONH}_4 + \text{CH}_3\text{CONH}_2 + \text{H}_2\text{O}$

10. B: Hint:  $\text{CH}_3\text{CN} + \text{HCl}_{(aq)} \rightarrow \text{CH}_3\text{COOH} + \text{NH}_4\text{Cl}$

11. A



12. A: Hint:  $\text{R-CN} + \text{H}_2\text{O}^+ \rightarrow \text{R-COOH}$

13. D: Hint:  $2\text{C}_2\text{H}_5\text{COOH} - \text{Na}_2\text{CO}_3 \rightarrow$



14. D: Hint:  $\text{CH}_3\text{CN} + \text{HCl}_{(aq)} \rightarrow \text{CH}_3\text{COOH} + \text{NH}_4\text{Cl}$

15. C: Hint:  $\text{CH}_3\text{COOH} + \text{PCl}_5 \rightarrow \text{CH}_3\text{COCl} + \text{POCl}_3 + \text{HCl}$

16. A

17. A

18. A

19. B

20. B

21. C

22. B: Hint: O - H bond is broken in alcohol during esterification reaction

23. C

24. D: Hint:  $\text{CH}_3\text{COOH} + \text{PCl}_5 \rightarrow \text{CH}_3\text{COCl} + \text{POCl}_3 + \text{HCl}$

25. A: Hint:  $\text{R'COOH} + \text{ROH} \rightleftharpoons \text{R'COOR}$



Ester (Fruity Smell)

26. C

27. C: Hint:  $\text{RCOOH} + \text{LiAlH}_4 \rightarrow \text{ROH}$

28. C

29. C: Hint:  $2\text{ROH} + 2\text{Na} \rightarrow 2\text{RONa} + \text{H}_2$

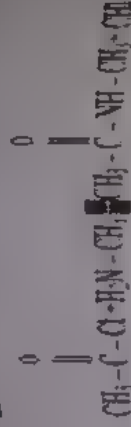


Ester (Fruity Smell)

30. C

Hint: Nis - substitution reaction with type carboxylic acid.

31. D

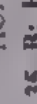


32. C: Hint:  $\text{CH}_3\text{COOH} + \text{NH}_3 \rightarrow \text{CH}_3\text{COONH}_4$



33. C: Hint:  $\text{Cl}^-$  is a nucleophile.

34. B: Hint:  $\text{CH}_3\text{COOH} + \text{PCl}_5 \rightarrow \text{CH}_3\text{COCl} + \text{POCl}_3 + \text{HCl}$



35. B: Hint:  $2\text{CH}_3\text{COOH} + \text{Mg} \rightarrow (\text{CH}_3\text{COO})_2\text{Mg} + \text{H}_2(\text{g})$

36. B: Hint: Carboxylic acid is stronger acid due to negative conjugation base and then phenol but alcohol is weakest acid due to least stability conjugation base

37. A: Hint: Trichloro substituted acetic is a stronger acid among all chloro acetic acid because three electron withdrawing group strongly withdraw electron density from hydroxyl group and ultimately stabilize the conjugate base.

to:

A) Any H-

B) Same c

C) Alterna

D) Neighb

The amin

ionic form

Acidic

Beta am

Organic

carboxyl

A) Amino

C) Saccha

Which on

amino ac

(A)  $\text{H}_3\text{C}-\text{C}-\text{N}$

(B)  $\text{H}_2\text{N}-\text{C}$

The -NH-

A) Amide

C) Amino

Which on

# UNIT 19: Amino Acids

Structure of Amino Acids found in Proteins

Amino acids which are not prepared by human

are called

[2014]

- essential amino acids
- non-essential amino acids
- alpha amino acids
- beta amino acids

Which one of the following reagents is used for identification of amino acid?

[2014]

- Fehling's solution
- Benedict's solution
- Copper sulphate
- Copper sulphate

Amino acids are compounds having carboxylic acid as well as amino functional groups attached

[2013]

- any H-atom in the molecule
- any carbon atom
- any carbon atom
- any carbon atom

The amino acids which largely exist in dipolar form are

[2013]

- Acidic amino acids
- Basic amino acids
- Beta amino acids
- Alpha amino acids

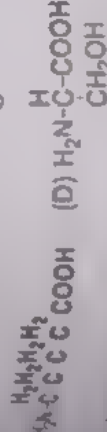
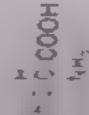
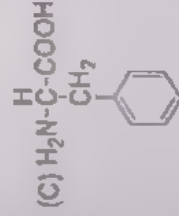
Organic compound containing both amino and carboxyl group is known as:

[2012]

- Amino acid
- Fatty acid
- Saccharide
- Amide

Which one of the following structures is not an alpha amino acid?

[2012]



The NH-CO group is called

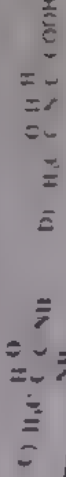
[2011]

- Amide group
- Protein linkage
- Amide group
- Peptide linkage

Which one of the following is an alpha amino acid?

[2011]

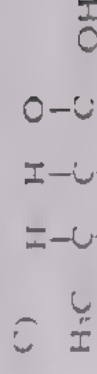
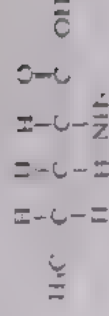
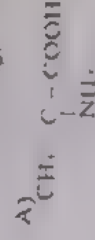
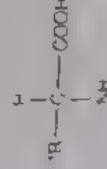
# NUMS and National NDCAT by Ali Sudais



Amino Acids on the basis of Nature of R-group

9. Among the following choose the correct option regarding the structure of Alanine.

[2017]



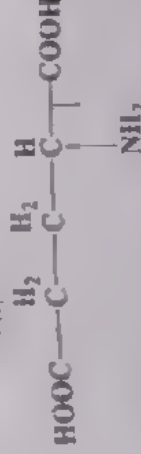
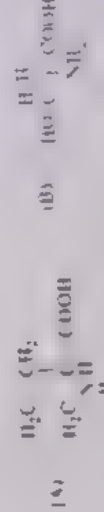
10. IUPAC name of alanine is:

[2017]

- 2-Aminopropanoic acid
- 2-Aminobutane-1,4-dioic acid
- 2-Aminoethanoic acid
- 2-Aminobutanoic acid

11. Which one of the following is structural formula of proline?

[2016]





12. What is the name of the above given structure formula?

[2016]

- A) Aspartic acid  
B) Asparagine  
C) Adipic acid  
D) Glutamic acid

13. Which one of the following is simple amino acid?

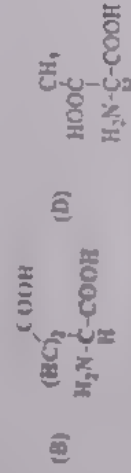
[2016]

- A) Lysine  
B) Isoleucine  
C) Alanine  
D) Glycine

14. Which one of the following structures shows the correct formula of glutamic acid?

[2015]

- (A)  $\text{H}_2\text{N}-\text{C}(\text{H})-\text{COOH}$  (B)  $\text{H}_2\text{N}-\text{CH}(\text{COOH})-\text{COOH}$



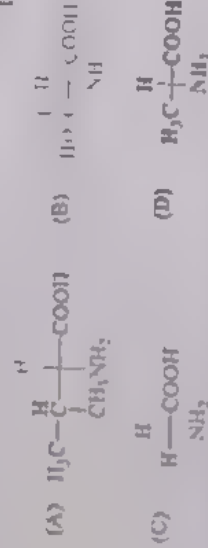
15. Which one of the following amino acids is basic in nature?

[2015]

- A) Glycine  
B) Alanine  
C) Lysine  
D) Glutamic acid

16. The structure formula for alanine is

[2015]

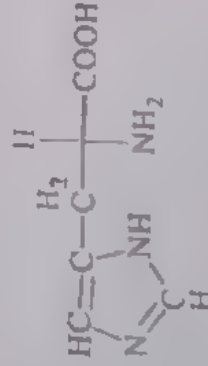


17. Indicate the cyclic amino acid from the following

[2014]

- A) Cysteine  
B) Serine  
C) Methionine  
D) Proline

18. The structure shown below represents



- A) Proline  
B) Histidine  
C) Glycine  
D) Lysine

[2014]

(A)  $\text{H}_2\text{N}-\text{C}(\text{H})-\text{COOH}$

(C)  $\text{H}_2\text{N}-\text{C}(\text{H})-\text{CO}_2\text{H}$

(B)  $\begin{array}{c} \text{H} \\ | \\ \text{H}_2\text{N}-\text{C}-\text{COOH} \\ | \\ \text{CH}_2\text{COOH} \end{array}$  (D)  $\begin{array}{c} \text{H} \\ | \\ \text{H}_2\text{N}-\text{C}(\text{H})-\text{CO}_2\text{H} \end{array}$

20. What is the name of amino acid, where R group?

- A) Glycine  
B) Lysine  
C) Aspartic acid  
D) Alanine

21. Aspartic acid is an acidic amino acid, where R chemical formula

(A)  $\text{H}_3\text{C}-\text{C}(\text{H})-\text{COOH}$  (C)  $\text{H}_3\text{C}-\text{C}(\text{H})-\text{COOH}$

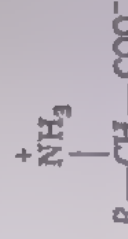
(B)  $\begin{array}{c} \text{NH}_2 \\ | \\ \text{H}_3\text{C}-\text{C}-\text{COOH} \\ | \\ \text{H} \end{array}$  (D)  $\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{H}_3\text{C}-\text{C}-\text{COOH} \\ | \\ \text{H} \end{array}$

22. Which of the following has an amino R group

- A) Lysine  
B) Valine  
C) Proline  
D) Alanine

Zwitter Ion

23. In aqueous solution amino acids exist in zwitterion form as shown below:

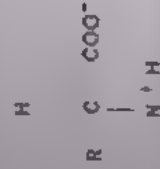
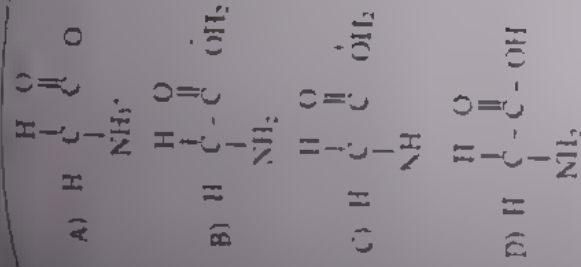


This ionic form of amino acid is known as:

- A) Cation  
B) Ampholyte  
C) Zwitter ion  
D) Anion

24. Among the following structure, identify the one which represent the structure of Zwitter ion

28. The fo



Select the best option indicating the name of the above structure

- A) Cation  
B) Neutral amino acid  
C) Internal salt  
D) Anion

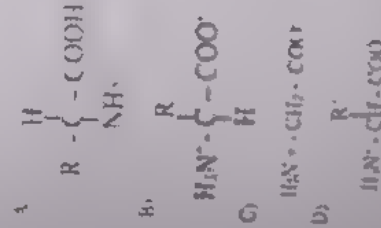
[2016]

In the formation of zwitter ion which one of the following donates the proton?

- A)  $\text{COOH}$   
B)  $\text{NH}_2$   
C)  $\text{CH}_3\text{COO}$   
D)  $\text{OH}^-$

[2016]

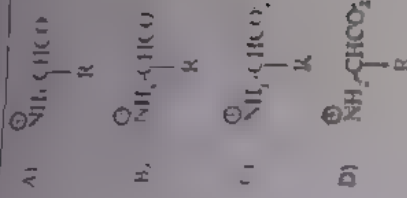
Select the correct zwitter ionic structure for amino acid?



[2015]

The formula of 'zwitter ion' is represented by

[2013]



### Acid base properties of Amino Acids

29. Acidic character of amino acid is due to:

- A)  $-\text{NH}_2$   
B)  $-\text{NH}_3^+$   
C)  $\text{H}^+$   
D)  $-\text{COO}^-$

[2017]

30. When acid is added to an amino acid, which one of the following will act as a base?

- A)  $\text{NH}_3^+$   
B)  $\text{COO}^-$   
C)  $-\text{COOH}$   
D) R group

[2016]

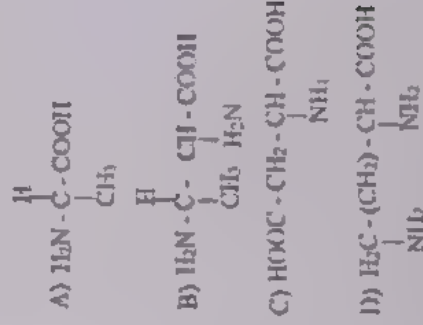
31. At low pH or in acidic condition amino acid exist as

- A) Anion  
B) Cation  
C) Zwitter ion  
D) Neutral Species

[2014]

32. Alanine is an amino acid which shows neutral effect on litmus paper, the formula of alanine may be:

[2012]



33. In basic conditions, amino acid exists in which of the following forms?

[2012]

- A)  $\text{H}_3\text{N}^+ - \text{CH}_2 - \text{COOH}$   
B)  $\text{NH}_2 - \text{CH}_2 - \text{COOH}$   
C)  $\text{H}_3\text{N}^+ - \text{CH}_2 - \text{COO}^-$   
D)  $\text{H}_2\text{N} - \text{CH}_2 - \text{COO}^-$

34. At intermediate value of pH, amino acids form zwitter ions containing

[2011]

- A)  $\text{NH}_4^+$  and  $\text{COO}^-$  B)  $\text{NH}_2$  and  $\text{COO}^-$   
C)  $\text{NH}_2^+$  and  $\text{COOH}$  D)  $\text{NH}_2$  and  $\text{COOH}$

35. The nature of amino acid lysine is:

[2010]

- A) Neutral B) Acidic  
C) Basic D) Amphoteric

### Peptide bond formation

36. Amino acids are bi functional compounds with a general formula  $\text{NH}_2\text{CH(R)}\text{CO}_2\text{H}$ . a tripeptide is formed between Alanine (ala), Glycine (gly) and lysine (lys). There is no repetition of amino acid in this tri-peptide, suggest how many tri-peptide are possible?

[2019]

- A) 9 B) 3  
C) 6 D) 12

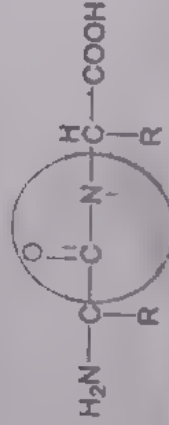
37. Which of the following bond is responsible for joining the amino acids in proteins?

[2019]

- A) Ionic bond B) Metallic bond  
C) Disulfide bond D) Peptide bond

38. Amino acids react with each other such that  $\text{COOH}$  group of one amino acid reacts with the  $\text{NH}_2$  group another amino acid to give a condensed structure as shown below:

[2018]



What is the name of circled part of this structure?

- A) Peptide linkage B) Ester linkage  
C) Azide linkage D) Carbide linkage

39. Two or more amino acids condensed to form protein by a peptide linkage which is present between two atoms:

[2013]

- A) C and C B) C and N  
C) O and C D) C and H

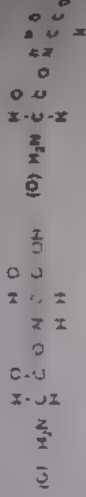
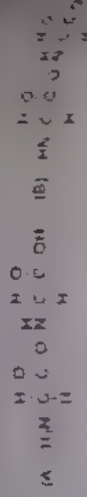
40. The reaction:

[2013]

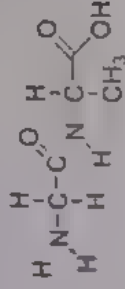


NUMS and National MDCAT by Ali Series

Gives a product called dipeptide represented by



41.

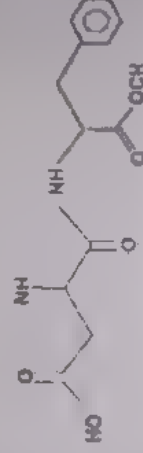


This structure is

- A) Gly Ala (dipeptide) B) Asp-Gly (Dipeptide)  
C) Gly-Val (dipeptide) D) Asp-Val (dipeptide)

42. The skeletal formula of dipeptide formed between aspartic acid and phenylalanine is given below

[2012]

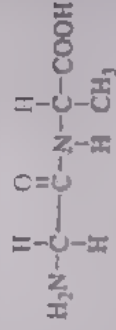


How many functional groups are present in its formula?

- A) 1 B) 2  
C) 4 D) 3

43. Structure of dipeptide is

[2012]



This is called

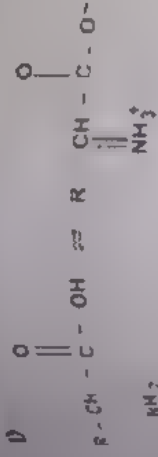
- A) Glycyl glycine B) Glycyl alanine  
C) Alaninyl alanine D) Alaninyl glycine  
44. A polymer in which the number of amino acid residue is greater than 100 or the molecular mass is greater than 10,000 is called

[2011]

- A) Protein B) Dipeptide  
C) Polypeptide D) Tripeptide

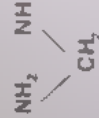
A Hint: Ninhydrin reacts with amino acid to form a bluish violet product.

B Hint: An  $\alpha$ -amino acid contains both carboxyl group as well amino group on same carbon atom.



C Hint: An  $\alpha$ -amino acid is an amino acid in which amino group is attached at  $\alpha$ -carbon atom.

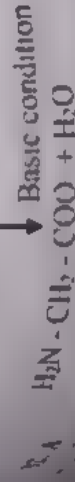
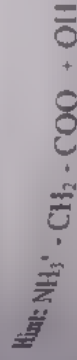
B Hint: Lysine, Histidine and Arginine are basic amino acids



A Hint: In the formation, Of zwitter ion carboxyl group donates proton to the amino group.

B Hint:  $\text{NH}_3^+$  group shows acidic character

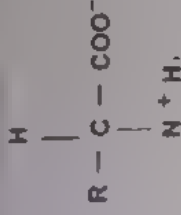
B Hint:  $\text{COO}^-$  act as a base because it accepts proton from an acid



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33. D: Hint: In basic condition ( $-\text{NH}^+$ ) group losses hydrogen ion

34. A: Hint: An intermediate value of pH means pH 7, pH zwitter ion exists



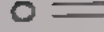
35. C

36. C

37. D

38. A

39. B



Hint:  $-\text{C} - \text{NH} -$

40. D

41. A

42. C: Hint:

1) Carboxylic Acid

2) Amino group

3) Amide group

4) Ester group

43. B

44. A



## UNIT 20 Macromolecules

## Addition polymerization

1. Which one the following compound is additional polymer?

- [2019]  
 A) Carbohydrate B) Polyvinyl chloride  
 C) Nylon D) Polyester  
 2. Disposable cups are made of a polymer polystyrene. Polystyrene is

[2019]  
 A) A polyamide

- B) A condensation polymer  
 C) An addition polymer  
 D) A polyester

3. Identify the monomers of Polyvinyl chloride:

[2017-Retake]

- A) Vinyl acetate B) Butyl maleate  
 C) Styrene D) Vinyl chloride

4. Among the following, which compound is formed by addition polymerization:

[2017-Retake]

- A) Polystyrene B) Polyester  
 C) Nylon D) Both A & B

5. Which is the structure of polyvinyl chloride (polychloroethene)?

[2018]

- (A)  $\text{H}_2\text{C}=\text{C}-\text{Cl}$  (B)  $\text{H}_2\text{C}-\text{C}(\text{Cl})_2$  (C)  $\text{H}_2\text{C}=\text{CCl}_2$   
 (D)  $\text{H}_2\text{C}-\text{CHCl}-\text{CHCl}-\text{CHCl}$

6. Which one of the following polymer is a polystyrene?

[2015]

- (A)  $\left( \begin{array}{c} \text{H} \\ | \\ \text{C}=\text{C} \\ | \\ \text{H} \end{array} \right)_n$  (B)  $\left( \begin{array}{c} \text{H} \\ | \\ \text{C}=\text{C} \\ | \\ \text{H}_2 \end{array} \right)_n$   
 (C)  $\left( \begin{array}{c} \text{F}_2 \\ | \\ \text{C}=\text{C} \\ | \\ \text{F}_2 \end{array} \right)_n$  (D)  $\left( \begin{array}{c} \text{CH}_3 \\ | \\ \text{C}=\text{C} \\ | \\ \text{H} \end{array} \right)_n$

7. Polystyrene is an addition polymer. Which one of the following structures represent the monomer of polystyrene?

- [2014]  
 A)  $\text{CH}_2=\text{CH}$  B)  $\text{CH}_2=\text{CH}-\text{CH}_3$   
 C)  $\text{CH}_2=\text{CH}-\text{Cl}$  D)  $\text{CH}_2=\text{CH}-\text{C}_6\text{H}_5$

8. Polyvinyl acetate (PVA) is colourless and non-toxic resin used as an adhesive and as a binder for making

- A) Emulsion paints B) Toys  
 C) Gramophone recorders D) Compact discs  
 9. Polyvinyl chloride is an example of

[2011]

- A) Condensation polymer  
 B) Biopolymer  
 C) Addition polymer  
 D) Thermosetting polymer

10. Macromolecules are described as large molecules built up from small repeating units called

[2011]

- A) Monomers B) Isomers  
 C) Metamers D) Tautomers

11. Macromolecules are defined as large molecules built up from small repeating units called:

[2011]

- A) Monomers B) Metamers  
 C) Isomers D) Tautomers

12. PVC is an example of

[2011]

- A) Addition polymer B) Biopolymer  
 C) Condensation polymer  
 D) Thermosetting polymer

(Condensation polymerization.)

13. Nylon-6,6 is also called:

[2018]

- A) Polystyrene C) Polyamide  
 B) Polyester D) Polyvinylidene

14. The amide linkage, present in nylon-6,6 has the structure:

[2017]

- (A)  $\text{H}_2\text{N}-\text{C}(=\text{O})-\text{NH}_2$  (B)  $\text{H}-\text{N}(=\text{O})-\text{C}(=\text{O})-$

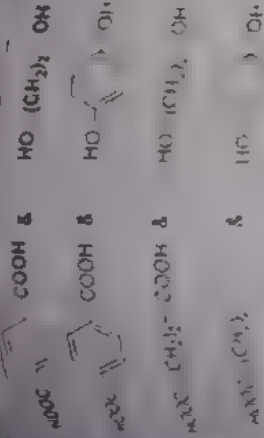
- (C)  $\text{O}=\text{C}-\text{O}-\text{C}(=\text{O})-\text{H}$  (D)  $\text{H}_2\text{N}-\text{O}-\text{C}(=\text{O})-$

15. The monomers needed to make "Terylene" is polyester are:

[2017]

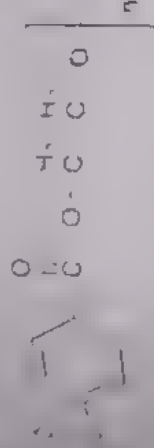
- A) Seven C) Six  
 B) Eight D) Five

- A) Polystyrene C) Polyester  
 B) Polyethylene D) Terylene



Which one of the following polymer is called as

- B) Polyvinylchloride [2016]  
 D) Polyvinyl acetate



Indicate the name of the above structure:

- A) Nylon 6,6 [2016]  
 B) Adipic acid  
 C) PVA  
 D) Polyester  
 1) Polyamide is formed due to the condensation of  
 hexamethylenediamine with  
 terephthalic acid with

- A) Hexane-1,3-diamine [2015]  
 B) Hexane-1,6-diamine  
 C) Hexane-1,4-diamine  
 D) Hexane-2,5-diamine  
 Which one of the following is an example of co-  
 polymer?

- A) Polyamide [2015]  
 B) Polystyrene  
 C) Polyvinyl acetate  
 D) Polyvinyl chloride  
 Which one of the following is an example of  
 condensation polymer?

- A) Polyvinylchloride [2014]  
 B) Polystyrene  
 C) Polyethylene  
 D) Polyamide  
 Adipic acid and hexamethylene diamine, both of  
 which have carbon atoms:

- A) Four [2012]  
 B) Eight  
 C) Six  
 D) Four  
 Hexanedioic acid is heated with  
 hexamethylenediamine the compound formed is. [2011]

- A) Peptide  
 B) Addition polymer  
 C) Polyester  
 D) Nylon 6,6  
 Which polyester is an example of [2011]

- A) Lipids  
 B) Lipids

NUNES and National NMDCAT by Ali Sudals

- C) Condensation polymer [2013]  
 D) Addition polymer  
 are product of reaction of an alcohol and  
 aromatic bi functional acids

- A) Polyester resins [2008]  
 C) PVC  
 D) Polyamide resins

# Structure of Proteins.

25. Phosphoprotein comes under the type of proteins:

- A) Simple protein [2017-Retake]  
 B) Conjugated protein  
 C) Derived protein  
 D) Both A & B

26. Hemoglobin is a

- A) Genetic protein [2015]  
 B) Building protein  
 C) Transport Protein  
 D) Structural protein

27. Collagen proteins are present in throughout the body.

- A) Muscle [2014]  
 B) Red blood cell  
 C) Tendons  
 D) Blood plasma

28. \_\_\_\_\_ is a fibrous protein present most abundantly in

- A) Arteries [2013]  
 B) Hair  
 C) Nail  
 D) Tendons

29. Collagen and albumin are :

- A) Derived proteins [2010]  
 B) Simple proteins  
 C) Polyamide  
 D) Polysaccharide

## Structure and function of Nucleic acid DNA .

30. According to Watson and Crick's model of DNA, the DNA molecule consists of a double helix. What type of forces is responsible to keep two strands of DNA together?

- A) Hydrogen bonding [2019]  
 B) Dipole-induced dipole forces  
 C) Van der Waal's forces  
 D) Ionic bonding

31. An intermolecular force of attraction X is relatively stronger than the other intermolecular forces, it stabilizes  $\alpha$ -helix and  $\beta$ -pleated sheets of proteins. The double helical, structure of DNA is also stabilized by this force of attraction. Identify X.

[2019]

- A) Hydrogen bonding

NMDCAT in my Pocket (Our YouTube Channel)

- B) Van der Waals forces  
C) Ionic interactions  
D) Dipole-dipole attraction

32. Which one of the following is the main function of DNA? [2017]

- A) Making of proteins  
B) Making of amino acids  
C) Breaking of ribose sugar  
D) Carries genetic information

33. Which one of the following nitrogen bases is NOT present in DNA? [2016]

- A) Adenine  
C) Uracil  
B) Guanine  
D) Cytosine

34. Out of these which nitrogen base is NOT present in DNA? [2015]

- A) Adenine  
C) Uracil  
B) Guanine  
D) Thymine

35. Which one of the following bases is not present in RNA? [2014]

- A) Cytosine  
C) Thymine  
B) Adenine  
D) Guanine

36. \_\_\_\_\_ serve as carriers of heredity from one generation to the other [2008]

- A) Lipids  
C) From aldehyde  
B) Caseins  
D) Nucleoproteins

#### Old topic MCQs

37. Which one of the following is an exact composition of a carbohydrates? [2016]

- A) Carbon and hydrogen  
C) Carbon, hydrogen, and oxygen  
D) Hydrogen and oxygen  
B) Carbon and oxygen

38. In the woody parts of trees, the %age of cellulose is: [2016]

- A) 50%  
C) 30%  
B) 10%  
D) 100%

39. In laboratory experiment an unknown compound was added in test tube containing iodine, the colour became intense blue. What could be the unknown compound? [2016]

- A) Cellulose  
C) Ribose  
B) Raffinose  
D) Starch

40. The specific substance (metabolic) that fits on the enzyme surface and is converted to products is called [2015]

- A) Co-factor  
C) Isoenzyme

B) Prosthetic group  
D) Substrate

41. Among the most common disaccharides which of the following presents in milk?

- A) Sucrose  
B) Maltose  
C) Fructose  
D) Lactose

42. Both ribose and deoxyribose are monosaccharides containing carbon atoms.

- A) Four  
C) Five  
B) Six  
D) Seven

43. The increased quantities of cholesterol in the make plaque like deposits in the arteries can be [2017]

- A) Cholera  
C) Down's syndrome  
B) Heart attack  
D) Phenylketonuria

44. Animals store glucose in the form of glycogen. [2017]

- A) Liver and muscles  
C) Mouth  
B) Stomach  
D) Small intestine

45. The principal energy storage carbohydrate in animals is [2018]

- A) Glucose  
C) Protein  
B) Starch  
D) Glycogen

46. Starch is a polymer of [2017]

- A)  $\beta$ -D-glucose  
C)  $\gamma$ -D-glucose  
B)  $\alpha$ -D-glucose  
D)  $\alpha$ -L-glucose

47. The reaction between fats and caustic soda is called [2017]

- A) Hydrogenolysis  
C) Esterification  
B) Fermentation  
D) Saponification

48. Lactose is a sugar present in milk. It is an example of [2017]

- A) Disaccharides  
C) Polysaccharides  
B) Monosaccharides  
D) Starch containing

49. Glucose and fructose are common example of [2011]

- A) Pentoses  
C) Hexoses  
B) Heptoses  
D) Butoses

50. The reaction between fats and caustic soda is called [2011]

- A) Hydrogenolysis  
C) Fermentation  
B) Carboxylation  
D) Saponification

51. The formula of acrylonitrile is: [2011]

- A)  $\text{CH}_2=\text{CH}-\text{CN}$   
B)  $\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CN}$   
C)  $\text{CH}_2-\text{CH}_2-\text{CN}$   
D)  $\text{CH}_3-\text{CN}$

1. B  
2. D  
3. C  
4. A  
5. A  
6. A  
7. D

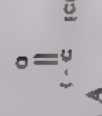


8. A  
9. C  
10. A



11. A  
12. A

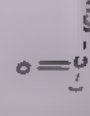
13. C  
14. C  
15. A  
16. C  
17. D  
18. B



19. A

20. D: Hint: monomer with an e

21. C  
22. D



23. B  
24. B  
25. B  
26. C  
27. C

1. B
2. D
3. C
4. A
5. A
6. A
7. D



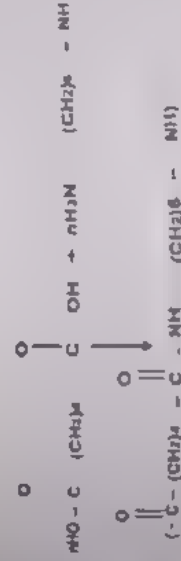
8. A
9. C
10. A



11. A
12. A:



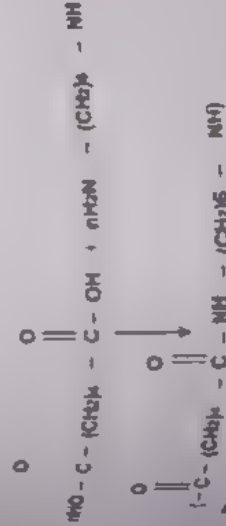
13. C
14. C
15. A
16. C
17. D
18. B



19. A

20. D: Hint: In condensation polymer two different monomers condense together to form a polymer with an elimination of small molecules.

21. C
22. D



23. B
24. B
25. B
26. C
27. C

28. D
29. B
30. A
31. A
32. A
33. C
34. C
35. C
36. D
37. C
38. A
39. D
40. D
41. D
42. C
43. A
44. A
45. D
46. B
47. D
48. A
49. C
50. D
51. A



1. Nitrogen dioxide is

A) Pollutants

B) Greenhouse gas

C) Both A and B

D) None of these

2. Which one of the following pollutants can cause in red blood cells?

A) Chlorofluorocarbons

B) Oxides of sulphur

C) The yellowish brown colour in polluted atmosphere is due to the presence of

A) Sulphur dioxide

B) Nitrogen dioxide

C) Carbon monoxide

D) Hydrogen sulphide

4. The increase in the concentration of oxidizing agents in polluted atmosphere is due to the presence of

A) Carbon monoxide

B) Nitrogen dioxide

C) Carbon dioxide

D) Hydrogen sulphide

5. The unpolluted atmosphere is generally made due to

A) Carbon monoxide

B) Nitrogen dioxide

C) Carbon dioxide

D) Hydrogen sulphide

6. Peroxyacetyl nitrate is a pollutant which may be seen

A) In the atmosphere

B) In the water

C) In the soil

D) In the air

7. The yellowish colour of polluted atmosphere is due to the presence of

A) Nitrogen dioxide

B) Carbon monoxide

C) Sulphur dioxide

D) Hydrogen sulphide

8. Which of these pollutants is produced by burning of coal and causes acid rain?

A) Carbon monoxide

B) Nitrogen dioxide

C) Sulphur dioxide

D) Hydrogen sulphide

9. \_\_\_\_\_ is the major source of acid deposition in the atmosphere

A) Sulphur dioxide

B) Nitrogen dioxide

C) Carbon monoxide

D) Hydrogen sulphide

10. Which agent is responsible for the acid rain?

A) Sulphur dioxide

B) Nitrogen dioxide

C) Carbon monoxide

D) Hydrogen sulphide

11. The largest source of acid rain is the oxides of

A) Nitrogen

B) Sulphur

C) Carbon

D) Hydrogen

12. Which of the following is responsible for depletion of ozone layer?

A) Chlorofluorocarbons

B) Oxides of sulphur

C) Carbon monoxide

D) Hydrogen sulphide

13. Chlorofluorocarbons (CFCs) are important compounds which are used as refrigerants.

These are also responsible for ozone depletion.

If a chlorofluorocarbon (CFC) is present in stratosphere, which of its reaction intermediates are actually responsible for the breakdown of ozone molecule?

A) Chlorine atoms

B) Fluorine atoms

C) Both A and B

D) None of these

14. Which of the following would react with ozone in the atmosphere?

A) Carbon monoxide

B) Nitrogen dioxide

C) Carbon dioxide

D) Hydrogen sulphide

15. The energy from the ultraviolet light is sufficient to break the bond in  $Cl_2$ .

A)  $Cl-Cl$  bond

B)  $Cl-Cl$  bond

C)  $Cl-Cl$  bond

D)  $Cl-Cl$  bond

16. Chlorination and bromination methods are used for

A) Disinfection

B) Sterilization

C) Decontamination

D) All of these

17. Ozone concentration is measured in

A) Dobson units

B) Parts per million

C) Micrograms per litre

D) None of these

18. The gas which is mainly produced in landfills from the waste is:

A) Methane

B) Carbon dioxide

C) Nitrogen

D) Hydrogen

1. Which one of the following wastes is considered as useful industrial fuel or to produce electricity?

- A) Coal
- B) Plastic

[2015]

2. The decomposition of organic matter i.e., aerobic bacteria in water sediments produce

[2013]

- B) Methane
- D) Butane

3. Lead is the metal, whose elevated concentration is harmful for fish as it clogs the gills then cause

[2012]

- B) Lead
- D) Aluminum

4. The suspected liver carcinogenic which also has a negative reproduction and developmental effects in human is

[2011]

- A) Iodoform
- B) Chloroform
- C) Bromoform
- D) Tropoform

5. The coagulant used in raw water to precipitate suspended impurities is:

[2010]

- A) Caustic soda
- B) Lime water
- C) Soda ash
- D) Alum

6. The flocculation process can reduce the volume of the water by:

[2009]

- A) One half
- B) Not affected
- C) One half
- D) Two third

Solution of Unit: 21

- 1. A
- 2. C
- 3. B
- 4. C
- 5. B
- 6. B
- 7. A
- 8. C
- 9. C
- 10. A, B
- 11. B

# MDCAT Biology

## Chapter 1 The Cell

### History & Introduction

1. The smallest independent unit of life is known as: [2013]

A) Cell B) Bacterial colony  
C) Chloroplast D) DNA

2. Robert Hooke was the first person to see cells in: [UHS-MODEL PAPER-2011]

A) Various plants B) Animals  
C) Fungi D) Cork

3. The concept "OMNIS cellula-e-cellula" means that, new cells are formed from.

[UHS-MODEL PAPER-2011]

A) Non-living materials  
B) Dead organic matter  
C) Pre-existing living cells.  
D) As the result of chemical reactions

### Light and electron (magnification And resolution)

4. If 15  $\mu\text{m}$  size object is observed under light microscope using 5x eyepiece and 10x objective, its magnified image size will be: [2019]

A) 250  $\mu\text{m}$  B) 500  $\mu\text{m}$   
C) 750  $\mu\text{m}$  D) 500  $\mu\text{m}$

5. The ability to distinguish between two separate points / objects are: [2018]

A) Fractionation B) Magnification  
C) Centrifugation D) Resolution

### Animal & plant cell

6. Select the organelles which is only present in animals cells [2017]

A) Centriole  
B) Rough endoplasmic reticulum  
C) Microtubule  
D) Ribosome

7. Which of the following is common organelle in plant and animal [2017-RETAKE]

A) peroxisome B) flagella  
C) centrioles D) plastids

8. Out of the given options, choose the one which shows the structure found only in plants [2016]

A) Vacuole, chloroplast, ribosomes  
B) Chloroplast, microtubules, peroxisomes  
C) Chloroplast, cell wall, Mitochondria

9. Presence of large central vacuole is a characteristic of: [2016]

A) Prokaryotes B) Protists  
C) Plants D) fungi

10. Plastids are only found in the: [2012]

A) Animals and plants B) Animals  
C) Plants D) Viruses

11. Plasma membrane is found in the cells of: [UHS-MODEL PAPER 2011]

A) Animals only B) Plants only  
C) Both plants and animals D) Bacteria only

### Plasma membrane : ( fluid mosaic model )

12. The basic structure of plasma membrane is provided by: [2016]

A) proteins B) cholesterol  
C) phospholipids D) cytoskeleton

13. Fluid mosaic model of plasma membrane states that protein molecules are in a fluid bilayer. [2015]

A) Galactose B) phospholipids  
C) Glucose D) carbohydrate

14. The model of plasma membrane suggests that proteins are embedded in lipid bilayer. [2013]

A) Unit membrane B) Permeable  
C) Ultracentrifuge D) Fluid mosaic

15. Plasma membranes chemically composed of: [2012]

A) Phospholipids only  
B) lipids and proteins  
C) lipids and carbohydrates  
D) glycoproteins

### Transport of material across the cell membrane

16. Passive processes for the movement of molecules across cell surface membrane are: [2019]

A) facilitated diffusion and osmosis  
B) pinocytosis and facilitated diffusion  
C) diffusion and exocytosis  
D) osmosis and phagocytosis

17. Taking in of solid particle by cell is called [2017-RETAKE]

A) phagocytosis B) pinocytosis  
C) exocytosis D) endocytosis

rapid exchange of material though carrier across the plasma membrane is called [2016]  
 A) active transport  
 B) facilitated diffusion  
 C) osmosis  
 D) endocytosis

[2014]

B) endocytosis  
 D) exocytosis

Endoplasmic reticulum (Cytoplasmic)

part of the cytoplasm or fluid that surrounds the organelles is known as: [2013]  
 A) solution  
 B) cytoplasm  
 C) cytosol  
 D) both a & b

soluble part of cytoplasm is termed as: [2007, 2008]  
 A) cytosol  
 B) both a & b

Endoplasmic reticulum

smooth endoplasmic reticulum is responsible for the metabolism of: [2019]

A) Carbohydrates  
 B) proteins  
 C) Nucleic acids  
 D) lipids

The organelle involved in detoxification of drugs and poisons in the liver cells is: [2016]

A) Rough endoplasmic reticulum  
 B) smooth endoplasmic reticulum  
 C) Golgi apparatus  
 D) lysosomes

The semicircular channels and system of tubes found in cytoplasm are known as: [2016]

A) ribosomes  
 B) glyoxisomes  
 C) endoplasmic reticulum  
 D) vacuoles

Endoplasmic reticulum contains a system of flattened membrane-bounded sacs, which are named as: [2012]

A) marks  
 B) tubules  
 C) vacuoles  
 D) marks

Which one of the following cell structure is involved in synthesis of lipids metabolism? (2012, 13, 15 & 18)

A) Smooth endoplasmic reticulum  
 B) Golgi complex  
 C) Centriole  
 D) Mitochondrion

Detoxification of harmful drugs within the cell is done by: [2009]

NLMs and National NDCAT by Ali Sudais

A) Nucleolus  
 B) Smooth surface endoplasmic reticulum  
 C) Ribosomes  
 D) Golgi bodies

Ribosomes

Site of protein synthesis in cells are [2018 & 2019]

A) Smooth endoplasmic reticulum  
 B) Ribosomes  
 C) Nucleolus / Golgi bodies  
 D) Endoplasmic reticulum/cisternae

ribosomes are made up of \_\_\_\_\_ and \_\_\_\_\_: [2019]

A) RNA and proteins  
 B) RNA and lipids  
 C) RNA and carbohydrates  
 D) proteins and carbohydrates

Ribosome present in prokaryotes are OR the prokaryotes possess small ribosomes of size: [2017 2017 - RETAKE & 2019]

A) 70S  
 B) 80S  
 C) 60S  
 D) 40S

Which of the following organelle consists of two subunits: [2017 - RETAKE]

A) Golgi body  
 B) Mitochondria  
 C) Ribosome  
 D) plastids

Ribosomes are tiny organelles, which are involved in the synthesis of: [2015]

A) Protein  
 B) RNA  
 C) Nucleus  
 D) Nucleosome

Ribosomes exists in two forms, either attached with the RER or freely dispersed in the: [2012]

A) Tonoplast  
 B) Golgi bodies  
 C) Cytoplasm  
 D) SER

A group of ribosomes attached to messenger RNA is known as: [2009 & 2017 - RETAKE]

A) Ribosome  
 B) lysosome  
 C) Nucleosome  
 D) polysome

GOLGI BODIES

The cisternae breaks up into vesicles from \_\_\_\_\_ of golgi [2018]

A) convex forming face  
 B) concave forming face  
 C) convex maturing face  
 D) concave maturing face

Which of the following organelles is concerned with cell secretion? [2011, 2014 & 2019]

A) Ribosomes  
 B) Golgi apparatus  
 C) Lysosomes  
 D) Mitochondria



37. Which of the following modifies proteins and lipids by adding carbohydrates?

[2008]

- A) Golgi apparatus  
B) polysome  
C) Plasma membrane  
D) None of these

#### MICROSOMES

38. The process by which unwanted structures within the cell are engulfed and digested with lysosomes is known as.

[2013]

- A) Endocytosis  
B) exocytosis  
C) Autophagy  
D) hydrolysis

39. The structures are involved in the breakdown of old organelles:

[2018]

- A) Leucoplasts  
B) lysosomes  
C) chloxyssomes  
D) chloxyssomes

40. Self-eating of lysosomes is called;

[2017-retake]

- A) phagocytosis  
B) pinocytosis  
C) Autophagy  
D) exocytosis

41. The enzymes of lysosomes are synthesized on:

[2013]

- A) Smooth endoplasmic reticulum  
B) Rough endoplasmic reticulum  
C) Chloroplast  
D) Golgi apparatus

42. Tay -sach disease is due to the presence of an enzyme that is inverted in the catabolism of.

[2009]

- A) Proteins  
B) carbohydrates  
C) Ascorbic acid  
D) lipids

#### MICROSOMES Peroxisomes and glyoxysomes

43. During photorespiration, the glycolate is converted into glycine in a structure of cell called:

[2009]

- A) Golgi bodies  
B) glyoxisome  
C) Mitochondria  
D) peroxisome

#### MICROSOMES Peroxisomes and glyoxysomes

44. Tonoplast bounds to which organelle.

[2018]

- A) endoplasmic reticulum  
B) vacuoles  
C) Golgi complex  
D) vesicles

#### CYTOSKELETON

45. In cross section each centriole consists of nine (each in triplets) of:

[2018]

- A) Microtubules  
B) Microfilaments  
C) Microvilli  
D) Intermediate filaments

46. Microtubules of spindle fibers are composed of a protein called

[2010]

- A) Tubulin  
B) actin  
C) Myosin  
D) troponin

NUNIS and National MDCAT by Ali Singh

47. Which of the following is most slender in structure?

- A) Microtubules  
B) Microfilaments  
C) Intermediate filaments  
D) Both a & b

#### CENTRIOLS

48. How many triplets of microtubules are present in centriole?

[2016]

- A) Ten  
B) Eight  
C) Nine  
D) Seven

49. At the beginning of nuclear division, the number of microtubule triplets in two pairs of centrioles migrate to opposite poles are:

[2015]

- A) 9  
B) 18  
C) 108  
D) 36

50. During animal cell division, the spindle fibers are formed from

[2014]

- A) Mitochondria  
B) centrioles  
C) Ribosomes  
D) lysosomes

51. Which of the following structures is absent in higher plants and found in animals cells?

[2013]

- A) Cytoskeleton  
B) Mitochondria  
C) Centriole  
D) Cytoplasm

52. Centrioles are made up of microtubules.

[2013]

- A) 9  
B) 3  
C) 12  
D) 27

#### Mitochondria

53. The inner membrane of mitochondria from eukaryotic infoldings called OR the finger like in folding which are formed by inner membrane of mitochondria in

[2016, 2017-RETAKE &amp; 2019]

- A) Cristae  
B) Cisternae  
C) Lamella tonoplast  
D) Bufidae pore

54. Organelle involved in aerobic respiration:

[2017-RETAKE]

- A) Mitochondria  
B) Lysosome  
C) Plastids  
D) Ribosome

55. Which organelle is bounded by two membranes?

[2015]

- A) Mitochondrion  
B) Mitochondrion  
C) Lysosome  
D) Nucleolus

56. In mitochondria, small knob like structures called particles are found in:

[2014]

- A) Outer membrane  
B) Outer compartment  
C) Inner membrane  
D) Inner compartment

57. Which one of the following is the site of oxidative phosphorylation in mitochondria?

[2014]



## Key of Chapter 1: The Cell

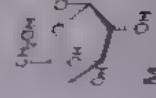
1. A
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66. C
67. C
68. B
69. C
70. B
71. A
72. B
73. D
74. D
75. D

1. C & Ali Series
2. Which bond has the most energy for cleavage?
3. The compound is a polyhydric alcohol.
4. The basic

5. monosaccharide
6. What is the general formula for monosaccharides?
7. Which of the following is not a disaccharide?

8. Monosaccharides are the building blocks of DNA.
9. The basic



10. The basic
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73. The basic
74. The basic
75. The basic

## Subject 2: Biological Molecules

Which bond is the potential source of chemical energy for cellular activities?

[2008]

- B) C-C  
D) H-O

### Carbohydrates:

Compounds on which on hydrolysis yield aldehydic or ketonic sub-units are:

[2016]

- C) Polynucleotides  
D) Carbohydrates

Carbohydrates are organic molecules and contain

four elements:

[2012]

- A) Carbon, water and oxygen  
B) Carbon, Sulphur and hydrogen  
C) Carbon, calcium and hydrogen  
D) Carbon, hydrogen and oxygen

The basic element of all organic compound is:

[UHS-MODEL PAPER-2011]

- A) Oxygen  
B) Nitrogen  
C) Hydrogen  
D) Carbon

### MONOSACCHARIDES:

\_\_\_\_\_ are the specific structures related to

monosaccharides:

[2017]

- A) Glycosidic bond  
B) Keto group  
C) Maltose  
D) Fructose

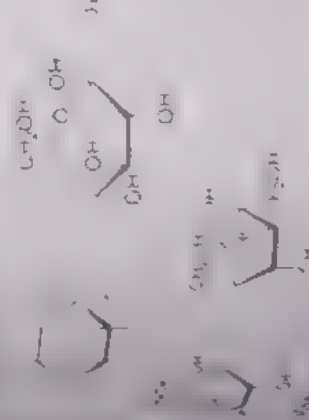
What is general formula of Monosaccharides?

[2017-Retake]

- A)  $C_6H_{12}O_6$   
B)  $C_n(H_2O)_n$   
C)  $(CH_2O)_n$   
D)  $C_n(H_2O)_{n-1}$

Which one of the following is the formula structure of D-glucose?

[2016]



Monosaccharides are major components of:

[2015]

- A) ATP, ribulose biphosphate and cysteine  
B) NAD, NADP and Insulin  
C) NADP, ATP and ribulose biphosphate  
D) RNA, RNA and myosin

NMMS and National NMDCAT by Ali Sudais

9. The most common respiratory substrate as a source of energy is:

[2014]

- A) Glucose  
B) Fructose  
C) Sucrose  
D) Insulin

10. Which of the following is a keto sugar? OR The simplest monosaccharides containing keto group is:

[2013 & 2014]

- A) Glyceraldehyde  
B) Ribose  
C) Dihydroxyacetone  
D) Glucose

11. Which one are intermediates in respiration and photosynthesis both?

[2012]

- A) Ribose and heptulose  
B) Glyceraldehyde and dihydroxyacetone  
C) Glucose and galactose  
D) Fructose and ribulose

### OLIGOSACCHARIDES:

12. Which is an example of a Disaccharide:

[2019]

- A) Lactose  
B) Starch  
C) Glycogen  
D) Fructose

13. Glycosidic bond is formed by:

[2018]

- A) Removal of water  
B) Removal of oxygen  
C) Addition of oxygen  
D) Addition of water

14. The bond formed between glucose and fructose to form sucrose is:

[2011]

- A) 1,4 glycosidic linkage  
B) 1,2 glycosidic linkage  
C) 1,6 glycosidic linkage  
D) 1,3 glycosidic linkage  
15. The covalent bond formed between two monosaccharides is called? OR The covalent bond or bridge between two monosaccharides to form a disaccharide is called as:

[2011 & 2019]

- A) Carboxyl/Peptide bond  
B) Hydroxyl/Disulphide bond  
C) Hydrogen bond  
D) Glycosidic bond

### POLYSACCHARIDES:

16. Starch is present in tuber, fruits and grains but absent in animal cells. Instead animals have a substance stored in liver and muscles known as:

[2019]

- A) Glucose  
B) Glycogen  
C) Galactose  
D) Glucagon

NMDCAT in my Pocket (Our YouTube Channel)



17. \_\_\_\_\_ are the major sites for the storage of glycogen in animal's body:

[2017]

- A) Muscles and liver  
B) Around thighs and belly  
C) Around belly and hips  
D) Liver and kidneys

18. Which of the following is light molecular weight and sparingly soluble in water:

[2017-Retake]

- A) Monosaccharides  
B) Disaccharides  
C) Oligosaccharides  
D) Polysaccharides

19. Which of the following component is found in the cell wall of fungi?

[2012]

- A) Cellulose  
B) Chitin  
C) Proteins  
D) Glycerol

20. \_\_\_\_\_ is the most abundant carbohydrate in nature?

[UHS-MODEL PAPER-2011 &amp; 2013]

- A) Cellulose  
B) Glycogen/waxes  
C) Fructose/ glycerol  
D) Starch

21. Which of the following component is more resistant to decay?

[2009]

- A) Lignin  
B) Starch  
C) Chitin  
D) Cellulose

22. Which of the following gives blue color with iodine?

[2008]

- A) Starch  
B) Cellulose  
C) Glycogen  
D) All of these

#### LIPIDS:

##### ACYLGLYCEROL:

23. Sara is a chemistry student who is carrying out an experiment between an alcohol and acetic acid in the laboratory. The product formed at the end of the experiment will be:

[2019]

- A) Glucose and oxygen  
B) Glycogen and water molecules  
C) An ester and water molecules  
D) Glycerol and Sulfuric acid

24. Lipids contain double amount of energy as compared to the same amount of carbohydrates due to the presence of:

[2019]

- A) Lower proportion of C-H bonds  
B) Higher proportion of C-O bonds  
C) Higher proportion of C-H bonds  
D) Higher proportion of oxygen

25. If in lipid there is a higher proportion of unsaturated fatty acids then it will be:

- A) Oil  
B) Waxes  
C) Phenols  
D) Fat

26. Acylglycerols like fats and oils are ester formed by condensation reaction between

- A) Fatty acids and water  
B) Fatty acids and glucose  
C) Fatty acids and alcohol  
D) Fatty acids and phosphates

27. Which of the following is Unsaturated Acid?

[2012,2015,2017 Retake &amp; 2019]

- A) Butyric acid  
B) Stearic acid  
C) Oleic acid  
D) Palmitic acid

28. Fatty acids are organic compounds contains hydrogen, oxygen and one of the following groups

[2011]

- A) Carboxylic  
B) Amino  
C) Acyl  
D) Sucose

#### Waxes:

29. Waxes are formed by combination of fatty acid with:

[2016]

- A) Alcohol  
B) Glycerol  
C) Serine  
D) Cysteine

30. Water proof surface like cuticle of leaf and protective covering of an insect's body are:

[2014]

- A) Phospholipids  
B) Waxes  
C) Terpenoids  
D) Acylglycerols

#### Phospholipids:

No MC Qs in any MDCAT PAPER

#### Terpenoids:

31. Which lipid is totally hydrophobic or insoluble?

[2016]

- A) Terpenoids  
B) Phospholipids  
C) Waxes  
D) Triglycerides

32. Terpenoids are important group of compounds that are made up of simple repeating units

[UHS-MODEL PAPER-2011]

- A) Acylglycerols  
B) Isoprenoids  
C) Phospholipids  
D) Ketones

#### Proteins:

Amino Acids and peptide bond formation

33. In glycerin R is \_\_\_\_\_:

[2011]

25. If in lipid there is a higher proportion of unsaturated fatty acids then it will be:  
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C) Phenols  
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B) Isoprenoids  
C) Phospholipids  
D) Ketones

#### Proteins:

Amino Acids and peptide bond formation

33. In glycerin R is \_\_\_\_\_:

[2011]

43. Proteins are made up of \_\_\_\_\_ type of amino acids.

[2017 & 2019]

- A) 20  
B) 21  
C) 22  
D) 23

44. The structure of a fibrous protein comprises of polypeptide chains in the form of:

- A) Coiled  
B) Flat uncoiled chains  
C) Spherical coiled ball  
D) Long steroid fibrils

45. Myosin is a \_\_\_\_\_ type of protein:

- A) Intermediate  
B) Simple  
C) Globular  
D) Fibrous

46. Chemically insulin and glucagon are:

- A) Carbohydrates  
B) Proteins  
C) Lipids  
D) Nucleic Acids

47. Antibodies are actually:

- A) Globular Proteins  
B) Glycoproteins  
C) Fibrous Proteins  
D) Glycoproteins

48. The nitrogen containing bases in nucleotide are of two types; purines and pyrimidines; the purine bases are:

- A) Guanine and Cytosine  
B) Adenine and Guanine  
C) Adenine, Guanine and Cytosine  
D) Adenine and Thymine

49. Which one is an example of a Nucleotide?

- A) Adenosine  
B) ATP  
C) Guanine  
D) NAD

50. Single ring pyrimidines are:

- A) Cytosine, Adenine and Thymine  
B) Adenine, Guanine and Cytosine  
C) Uracil, Cytosine and Thymine  
D) Adenine and Thymine

51. Following is the structure of:

- A) Uracil  
B) Thymine  
C) Guanine  
D) Cytosine

52. When x-rays are passed through crystalline DNA, it shows helix making one complete twist every: OR

53. The number of amino acids that have been found in cells and tissues are:

- A) 20  
B) 21  
C) 22  
D) 23

54. The number and sequence of amino acids along polypeptide chain:

- A) Secondary  
B) Quaternary  
C) Primary  
D) Tertiary

55. Which of the following holds the alpha-helix of protein in its place?

- A) Hydrogen bonds  
B) Disulphide linkage  
C) Peptide/amino groups  
D) Hydrophobic interactions

56. The structure of protein is found in:

- A) Primary Structure  
B) Secondary Structure  
C) Tertiary Structure  
D) Quaternary Structure

57. The structure of protein is found in:

- A) Primary Structure  
B) Secondary Structure  
C) Tertiary Structure  
D) Quaternary Structure

58. The structure of protein is found in:

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D) Quaternary Structure

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NUMS and National MDCAT by Ali Sudais

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B) Adenine and Guanine  
C) Adenine, Guanine and Cytosine  
D) Adenine and Thymine

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B) ATP  
C) Guanine  
D) NAD

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B) Adenine, Guanine and Cytosine  
C) Uracil, Cytosine and Thymine  
D) Adenine and Thymine

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B) Thymine  
C) Guanine  
D) Cytosine

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C) Primary  
D) Tertiary

61. Which of the following holds the alpha-helix of protein in its place?

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B) Disulphide linkage  
C) Peptide/amino groups  
D) Hydrophobic interactions

62. The structure of protein is found in:

- A) Primary Structure  
B) Secondary Structure  
C) Tertiary Structure  
D) Quaternary Structure

63. The structure of protein is found in:

- A) Primary Structure  
B) Secondary Structure  
C) Tertiary Structure  
D) Quaternary Structure

64. The structure of protein is found in:

- A) Primary Structure  
B) Secondary Structure  
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D) Quaternary Structure

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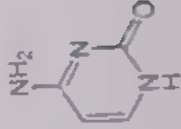
- A) Primary Structure  
B) Secondary Structure  
C) Tertiary Structure  
D) Quaternary Structure

66. The structure of protein is found in:

- A) Primary Structure  
B) Secondary Structure  
C) Tertiary Structure  
D) Quaternary Structure

67. The structure of protein is found in:

- A) Primary Structure  
B) Secondary Structure  
C) Tertiary Structure  
D) Quaternary Structure



A complete turn of the double helix of DNA comprises of:

- A) 3.4 nm  
C) 34 nm

[2017 &amp; 2018]

- B) 3.4 Angstrom  
D) 34 micrometer

53. All of the following are subunits of DNA except:

[2017, Retake]

- A) Deoxy ribose sugar  
C) Nitrogenous base  
D) Cholin

B) Phosphate group

54. Phosphodiester bond is:

- A) P-O-C-P-O-C  
C) C-O-P-O-C

B) C-O-P

D) C-C-O-P

55. Number of base pairs in one turn of DNA is

- A) 10  
C) 34

B) 2

D) 54

56. Which of the following is purine?

- A) Cytosine  
C) Uracil

B) Thymine

D) Guanine

57. Which of the following combination of base pair is absent in DNA?

- A) A-T  
C) A-U

B) C-G

D) T-A

58. The combination of a pentose sugar with a base results in a compound known as

- A) Nucleotide  
C) Nucleic acid

B) Nucleoside

D) Polynucleotide

59. One of the following pyrimidine bases is absent in DNA:

- A) Uracil  
C) Cytosine

B) Thymine

D) Adenine

60. The first microbe to have the genome completely sequenced and was published on July 28<sup>th</sup>, 1995 was:

- A) *Escherichia coli*  
B) *Haemophilus influenzae*  
C) *Haemophilus parainfluenzae*  
D) *Haemophilus influenzae*

A) *Haemophilus influenzae*B) *Haemophilus influenzae*C) *Haemophilus influenzae*D) *Haemophilus influenzae*

61. The reaction between the phosphate group of one nucleotide and hydroxyl group of another is a synthesis in DNA molecule.

- A) Dehydration  
C) Oxidation

B) Rehydration

D) Reduction

[2009]

NUMS and National MDCAT by All Series

62. The two strands in DNA are called each other

- A) Parallel  
C) Both A & B

B) Antiparallel

D) None of these

### TYPES OF RNA

63. The major RNA in the cell is ribosomal RNA makes up:

[UHS-MODEL PAPER]

- A) 80% of total RNAs  
C) 90% of total RNAs

B) 58% of total P

D) 40% of total P

### WATER

64. If water has high latent heat of vaporization, this property of water could be helpful to plants and animals?

- A) With the release of large amount of water, a small amount of heat loss can take place  
B) No cooling effect with the release of large amount of water vapours  
C) It will keep their temperature high  
D) With the release of small amount of water vapours, a great amount of heat loss takes place

[2016]

65. When an electron pair is shared between two atoms:

- A) Two covalent bonds are formed  
B) Hydrogen bond is formed  
C) Single covalent bond is formed  
D) Ionic bond is formed

[2011]

66. Name the human tissue that contain about 80% water:

- A) Nerve cells  
C) Brain cells

B) Bone cells

D) None of these

[2001]

### ENZYME

Definition and characteristics of enzymes

67. The type of energy reduced by the enzyme biological reactions to occur is called:

- A) Light energy  
C) Active energy

B) Activation energy

D) Heat energy

[2016]

68. A non-protein part essential for proper essential functioning of enzyme is called:

- A) Extra factor  
C) Efficient cofactor

B) Additional cofactor

D) Co factor

[2017]

69. All enzymes are:

- A) Fibrous proteins

B) Globular proteins

C) Enzymes

D) None of these

[2017]

### ACA & All Series

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B) Antiparallel

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D) None of these

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C) Active energy

D) Heat energy

71. The type of energy reduced by the enzyme biological reactions to occur is called:

A) Light energy

B) Activation energy

C) Active energy

D) Heat energy

72. The type of energy reduced by the enzyme biological reactions to occur is called:

A) Light energy

B) Activation energy

C) Active energy

D) Heat energy

73. The type of energy reduced by the enzyme biological reactions to occur is called:

A) Light energy

B) Activation energy

C) Active energy

D) Heat energy

74. The type of energy reduced by the enzyme biological reactions to occur is called:

A) Light energy

B) Activation energy

C) Active energy

D) Heat energy



new molecular weight proteins  
 lipoproteins  
 cellular proteins  
 the reactant on which enzyme works are:

[2017]

- B) Metabolites
- D) Catabolites

which one of the following comprises of inorganic

[2017]

- B) Activator
- D) Apoenzyme

what is true about enzymes?

[2017-Retake]

enzymes

prosthatic group

No effect on end product

Non-specific

enzyme required  $Mg^{++}$  to catalyze the substrate.

The  $Mg^{++}$  is best identified as:

[2016]

- B) Activator
- D) Inhibitor

which molecular structure of enzyme is essential

for activity of enzyme?

[2015]

- B) Primary
- D) Tertiary

some enzymes require helper which is a non-protein part for its efficient functioning. That is called:

[2015]

- B) Cofactor
- D) Apoenzyme

All coenzymes are derived from:

[2013,2014]

- B) Vitamins
- D) Carbohydrates

the cofactor/non protein part of an enzyme which is totally or tightly and permanently bonded to enzyme then it will be called:

[2011,2013,2014]

- B) Activator
- D) Prosthetic group

biochemically enzymes are:

[UHS-MODEL PAPER-2011]

- B) Fatty acids
- D) Proteins

the presence of enzymes:

[UHS-MODEL PAPER-2011]

- A) Slows down the rate of reaction
- B) Increase the rate of reactions
- C) Does not show any change
- D) Completely stops the reaction

80. Enzymes increase the rate of reaction by:

[2011]

- A) Increasing temperature
- B) Decreasing pH
- C) Decreasing activation energy
- D) Increasing activation energy

81. An enzyme and substrate react through a specific feature or site present in enzyme known as:

[2011]

- A) Binding site
- B) Active site
- C) Catalyst site
- D) Inhibition site

82. If the detachable co-factor is an inorganic ion then it is designated as:

[2012]

- A) Coenzyme
- B) Prosthetic group
- C) Holoenzyme
- D) Activator

83. An activated enzyme consisting of polypeptide and a cofactor is known as:

[2010]

- A) Amylase
- B) Apoenzyme
- C) Holoenzyme
- D) Coenzyme

## MODE/MECHANISM OF ENZYME ACTION

84. Modified form of Lock and Key model was proposed by:

[2017-Retake]

- A) Koshland
- B) Fischer
- C) Watson
- D) Rosalind Franklin

85. According to \_\_\_\_\_ model the active site of enzyme is modified as the substrate interacts with enzyme:

[2016]

- A) Induced fit
- B) Lock and key
- C) Emil Fischer
- D) Fluid mosaic

86. The view that active site of enzyme is flexible and when a substrate combines with it cause changes in enzyme structure is known as:

[2013]

- A) Lock and key model
- B) Sliding Filament model
- C) Induce fit model
- D) Specificity model

87. Lock and key model of enzyme reacting with substrate was originally proposed by:

[UHS-MODEL PAPER-2011]

- A) Emil Fisher
- B) Koshland
- C) Robert Hook
- D) Robert Brown



88. Enzyme after catalysis detaches itself from the product: [2009]

- A) Completely
- B) Incompletely
- C) Changed
- D) Unchanged

### FACTORS AFFECTING THE RATE OF ENZYME ACTION

89. The temperature that promotes the maximum activity of enzyme is referred as [2018]

- A) Fixed temperature
- B) Optimum temperature
- C) Controlled temperature
- D) Active temperature

90. Which one of the following graphs shows how the rate of reaction of pepsin is affected by pH? [2016]



- A) [Graph A]
- B) [Graph B]
- C) [Graph C]
- D) [Graph D]

91. Which of the following is the optimum pH of pancreatic lipase enzyme: [2013, 2014]

- A) 7.60
- B) 8.00
- C) 9.00
- D) 9.70

92. Pepsin, protein digesting enzyme acts best at pH/ optimum pH: [UHS-MODEL PAPER-2011, 2015]

- A) 3.00
- B) 4.5
- C) 2.00
- D) 6.00

93. Pepsin enzyme is produced in an inactive form and is activated in situation when it is required because: [2009]

- A) Not produced in complete form
- B) Quota capable of destroying cells internal structure
- C) It does not work efficiently

NUMS and National MDCAT by Ali Series

94. The optimum temperature for enzymes in body is: [2009]

- A) 32 °C
- B) 46 °C
- C) 37 °C
- D) 37 °C

### Inhibitors

95. What is common in both Competitive and competitive Inhibition? [2014]

- A) Irreversible Inhibition
- B) Feedback Inhibition
- C) Reversible Inhibition
- D) Non-Reversible Inhibition

96. A student of chemical engineering made a compound "A" which is a potent inhibitor of certain enzymes. He immediately brought to hospital where Dr. A. intravenously substrate "B" to minimize the effect of compound A. His life was saved in serious damages. The treatment method shows compound A was an inhibitor.

- A) Temperature Sensitive
- B) Competitive Reversible
- C) Irreversible
- D) Non-competitive Reversible

97. If molecule can bind to another site of the enzyme rather than the true active site, it is referred as [2014]

- A) Non-competitive Inhibitors
- B) Competitive Inhibitors
- C) Allosteric Inhibitors
- D) Irreversible Inhibitors

98. Which of the following type of inhibitor can neutralize by adding more substrate into reaction [2017-Remedial]

- A) Irreversible Inhibitor
- B) Reversible Inhibitor
- C) Irreversible/ non-competitive Inhibitor
- D) Irreversible/ competitive Inhibitor

99. The figure represents \_\_\_\_\_ inhibitor? [2011]



- A) Non-competitive
- B) Competitive
- C) Irreversible
- D) Isosteric

Which one of the following is an example of a competitive inhibitor?

- (A) Glucose (B) Fumarate [2015]  
(C) Succinic acid (D) Malonate

The type of inhibition in which inhibitor has no structural similarity to substrate and combines with enzyme at other than the active site is called:

[2012]

- (A) Reversible Inhibition  
(B) Irreversible Inhibition

(C) Non-competitive and reversible Inhibitors  
(D) Allosteric Inhibition

The inhibitors that bind tightly and permanently to enzymes and destroy their globular structure as catalytic activity are:

[2012]

- (A) Reversible Inhibitors

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- (B) Irreversible Inhibitors  
(C) Competitive Inhibitors  
(D) Non-competitive Inhibitors

103. Enzyme succinate dehydrogenase converts

succinate into:

- (A) Maltose (B) Malonic acid [2012]  
(C) Citrate (D) Fumarate

104. \_\_\_\_\_ forms weak linkages with enzymes and their effect can be neutralized completely or partly by an increase in concentration of the substrate.

[2010]

- (A) Only competitive Inhibitors  
(B) Reversible Inhibitors  
(C) Irreversible Inhibitors  
(D) Both reversible & irreversible Inhibitors

## Key of Chapter 2: BIOLOGY MOLECULES

10. A	19. B	28. A	37. B	46. B	55. A	64. D	73. B	82. D	91. C	100. D
11. B	20. A	29. A	38. A	47. A	56. D	65. C	74. D	83. C	92. C	101. C
12. A	21. C	30. B	39. C	48. C	57. C	66. C	75. B	84. A	93. B	102. B
13. A	22. A	31. C	40. A	49. B	58. B	67. B	76. B	85. A	94. D	103. D
14. B	23. C	32. B	41. A	50. C	59. A	68. D	77. D	86. C	95. C	104. B
15. D	24. B	33. C	42. B	51. D	60. D	69. D	78. D	87. A	96. B	
16. B	25. A	34. A	43. C	52. A	61. A	70. C	79. B	88. D	97. A	
17. A	26. C	35. A	44. D	53. D	62. B	71. B	80. C	89. B	98. B	
18. B	27. C	36. A	45. D	54. C	63. A	72. C	81. B	90. D	99. A	

## Chapter 3 Chromosomes and DNA

1. Meselson and Stahl transferred few bacteria grown in N15 to N14 medium for replication their DNA. What would be the result after two rounds of Replication? [2019]
- A) 50% hybrid duplex and 50% light duplex  
B) 50% hybrid duplex and 50% heavy duplex  
C) 100% heavy duplex  
D) 100% hybrid duplex
2. As a result of replication, parental DNA would become complex dispersed and that each strand of all the daughter molecules would be a mixture of old and new DNA. This is called as: [2019]
- A) Conservation Idea  
B) Dispersive idea  
C) Disruptive idea  
D) Semi-conservative Idea
3. Formation of new strands of DNA from template strands is the function of: [2017-Retake]
- A) DNA polymerase  
B) RNA polymerase  
C) DNA ligase  
D) Helicase
4. "If one were to unzip the molecule, one would need only to assemble the appropriate complementary nucleotides on the exposed single strand to form two daughter complexes with the same sequence" is the definition of: [2017-Retake]
- A) Semi-conservative model  
B) Conservative model  
C) Dispersive model  
D) Destruction model
5. The process of replication of DNA begins at [2010]
- A) One place only without any specific sequence of DNA  
B) One or more places without any specific sequence of DNA  
C) Any place with the uncoiling of two strands of DNA  
D) One or more places where there is a specific sequences of nucleotides
6. Enzyme which attaches the Okazaki fragments in lagging stands is called [2009]
- A) Restriction endonuclease  
B) DNA helicase  
C) Primase  
D) DNA ligase

## NUMS and National MDCAT by Ali Series

7. Which of following has 46 chromosomes? [2008]
- A) Corn  
B) Sugarcane  
C) Frog  
D) Mouse
8. In which direction, can a DNA polymerase assemble monomers to build a strand of DNA? [2009]
- A) From the 5 towards the 3 end of new strand being assembled  
B) From the replication centers in the two directions called replication forks  
C) From the 3 towards the 5 end of strand being assembled  
D) In both directions if DNA ligase is present

## GENE EXPRESSION

9. The process in which a complimentary copy of the code from a gene is produced by RNA polymerase in the nucleus: [2019]
- A) Proof reading  
B) DNA replication  
C) Transcription  
D) Translation
10. If sequence in DNA is CCCTAGAG, then what would be the sequence in messenger RNA after transcription? [2019]
- A) GGGAUCUC  
B) GGGATCTC  
C) GGGGTCTC  
D) GGAAUCUS
11. Sequence of amino acids in a polypeptide chain of protein molecule corresponds to the sequence of nucleotides in m RNA for that protein. If reading frame of m RNA for a human protein is 993 nucleotide including a stop codon at the end, how many amino acids would be incorporated in the polypeptide chain? [2019]
- A) 331  
B) 993  
C) 93  
D) 330
12. Formation of RNA from DNA is called: [2017-Retake]
- A) Translation  
B) Transcription  
C) Replication  
D) Reverse transcription
13. In translation the terminating codon is [2014]
- A) GUA  
B) UAA  
C) UUG  
D) AGU
14. If the genetic code is made up of three nucleotides then total possible genetic codes will be [2014]
- A) 4  
B) 20

1. A  
2. B  
3. A  
4. A  
5. D  
6. D  
7. A  
8. A  
9. C  
10. A  
11. D  
12. B  
13. B  
14. C  
15. C  
16. A

15. Amino acids attached at which site of RNA

Anticodon site

- A) Anticodon site  
B) Ribosomes recognition site  
C) 3'-site with terminal OH

[2010]

D) D) Activation enzyme recognition site  
16. If DNA strand is

[2009]

GCATGG

mRNA strand synthesized from it would be

- A) CCAUACC  
B) CGTATGC  
C) CGATACC  
D) CGUTCC

### Key of Chapter 3: Chromosome & DNA

1. A
2. B
3. A
4. A
5. D
6. D
7. A
8. A
9. C
10. A
11. D
12. B
13. B
14. C
15. C
16. A



## Chapter 4 CELL DIVISION

## CELL CYCLE AND ITS PHASES

1. Microtubule subunits (for spindle fibers) are synthesized in \_\_\_\_\_ phase? [2019]

A) G<sub>2</sub>  
B) M  
C) S  
D) G<sub>1</sub>

2. During the G<sub>2</sub> phase:

A) Specific enzymes are synthesized and DNA base units are accumulated [2019]  
B) The chromosomes are left with only one chromatid  
C) Chromosome number is duplicated  
D) Energy is stored for chromosome movement and mitotic specific proteins (tubulin) are produced

3. Synthesis of microtubule increases in:

A) G<sub>1</sub> phase [2018]  
B) S phase  
C) G<sub>2</sub> phase  
D) M phase

4. During which period of Interphase (cell cycle), DNA is synthesized?

A) G<sub>1</sub> [2014]  
B) G<sub>2</sub>  
C) S  
D) G<sub>0</sub>

5. In which stage of Interphase, there is increase in cell size and many biochemical are formed?

A) G<sub>1</sub> phase [2012]  
B) G<sub>2</sub> phase  
C) S phase  
D) C phase

6. In which phase of the cell division, the metabolic activity of the nucleus is high?

A) Mitosis [2011]  
B) Interphase  
C) Meiosis  
D) Cell cycle

## MITOSIS &amp; ITS SIGNIFICANCE

7. The phase of mitosis in which sister chromatids move towards opposite poles:

A) Prophase [2019]  
B) Anaphase  
C) Telophase  
D) Metaphase

8. During animal cell division, the spindle fibers are formed from:

A) Mitochondria [2014]  
B) Centrioles  
C) Ribosomes  
D) Lysosomes

9. The most critical phase of mitosis which causes equal distribution of chromatids in the daughter cells is:

A) Prophase [2014]  
B) Metaphase  
C) Anaphase  
D) Telophase

10. Cytokinesis is a division of:

A) Cytoplasm [UHS-MODEL PAPER-2011]  
B) Chromosomes  
C) Nucleus  
D) Nucleolus

11. During cell division the plant cell is not seen to have [UHS-MODEL PAPER-2011]

A) Spindle fibers  
B) Chromatids  
C) Centrioles  
D) Centrioles

12. When chromosomes uncoil, the nucleoli are formed and two nuclei are at two poles of the cell, the stage is known as:

A) Prophase [2011]  
B) Metaphase  
C) Telophase  
D) Anaphase

13. Healing of a wound and repair is the phenomenon which takes place by the process of:

A) Mitosis [2011]  
B) Meiosis  
C) Cell growth  
D) Meiosis & Mitosis

14. Phragmoplast is formed from vesicles which originates from:

A) Smooth Endoplasmic Reticulum [2011]  
B) Golgi Complex  
C) Ribosome  
D) Rough Endoplasmic Reticulum

15. Prophase, metaphase and telophase are subdivided of:

A) Mitosis [2009]  
B) Karyokinesis  
C) Cytokinesis  
D) None

## CANCER

16. Which of the following is main cause of cancer?

A) Mutations [2011]  
B) Controlled cell division  
C) Regulated mitosis  
D) Haploid division

A) Prophase I  
B) Anaphase I  
C) Exchange of chromosomes

A) Segregation  
B) Crossing over  
C) The kinetochore  
D) Elongate during

A) Prophase I  
B) Telophase I  
C) Chiasmata formation  
D) which is known

A) Crossing over  
B) Pairing

## MEIOSIS

21. Infertility, short stature, and hairline at base of ear

A) Down's Syndrome  
B) Edward's Syndrome  
C) Down's Syndrome  
D) chromosome 2

A) Monosomy  
B) Polysomy  
C) Which of the non-disjunction

A) Turner's Syndrome  
B) Down's Syndrome  
C) During maternal autosomal chromosome of an egg having

A) Klinefelter  
B) Turner's Syndrome  
C) Typical symptoms in males

A) Down's Syndrome

Crossing over takes place during \_\_\_\_\_ of meiosis: [2018]

- A) Prophase I  
B) Telophase I  
C) Anaphase I  
D) Metaphase I

Exchange of segments between non-homologous chromosomes is called:

- A) Segregation  
B) Independent assortment  
C) Crossing over  
D) Mutation

The kinetochore fibers contract and spindle fibers elongate during:

- A) Prophase I  
B) Metaphase I  
C) Telophase I  
D) Anaphase I

Chiasma formation takes place during a process which is known as:

- A) Crossing over  
B) Attachment  
C) Pairing  
D) Leptotene

### MEIOTIC ERRORS

Infertility, short height, webbed neck and low hairline at back are symptoms of:

- A) Down's Syndrome  
B) Turner's Syndrome  
C) Edward's Syndrome  
D) Patau's Syndrome

Down's syndrome is characterized by \_\_\_\_\_ at chromosome 21:

- A) Monosomy  
B) Trisomy  
C) Polysomy  
D) Disomy

Which of the following is an example of autosomal non-disjunction?

- A) Turner's Syndrome  
B) Jacob's Syndrome  
C) Down's Syndrome  
D) Metafemales

During maternal meiosis, non-disjunction of autosomal chromosomal pair results in the formation of an egg having 24 chromosomes in:

- A) Klinefelter's Syndrome  
B) Down's Syndrome  
C) Turner's Syndrome  
D) Jacob's Syndrome

Typical symptoms like enlarged breasts and small testes in males are attributed to:

- A) Down's Syndrome

- B) Turner's Syndrome  
C) Klinefelter's Syndrome  
D) phenylketonuria Syndrome

26. Turner's syndrome is characterized by having: [2015]

- A) Trisomy 21  
B) 44+XXY  
C) Trisomy 18  
D) 44 XO

27. The disease in which an individual has extra sex chromosome (44+XXY) is known as:

- A) Down's Syndrome  
B) Turner's Syndrome  
C) Klinefelter's Syndrome  
D) Jacob's Syndrome

28. Non-disjunctions of 21<sup>st</sup> pair of chromosome in one of the gametes leads to 47 chromosomes in new individual. This condition is called: [2015]

- A) Turner's Syndrome  
B) Klinefelter's Syndrome  
C) Down's Syndrome  
D) Jacob's Syndrome

29. If a person has 44 autosomes + XXY, he will suffer from: [2014]

- A) Klinefelter's Syndrome  
B) Down's Syndrome  
C) Turner's Syndrome  
D) Edward's Syndrome

30. Down's syndrome is a result of non-disjunction of \_\_\_\_\_ pair of chromosome that fails to segregate: [2012, 2013]

- A) 22<sup>nd</sup>  
B) 18<sup>th</sup>  
C) 14<sup>th</sup>  
D) 21<sup>st</sup>

31. Which human disease is due to meiotic errors?

[UHS-MODEL PAPER-2011]

- A) Typhoid  
B) Cholera  
C) Measles  
D) Down's Syndrome

32. Mental retardations, short stature, broad face and squint eyes all are symptoms of: [2011]

- A) Down's Syndrome  
B) Klinefelter's Syndrome  
C) Turner's Syndrome  
D) XYY Syndrome

33. Mental retardations, short stature, broad face and squint eyes all are symptoms of: [2011]

- A) Down's Syndrome  
B) Turner's Syndrome  
C) Klinefelter's Syndrome  
D) XYY Syndrome

34. Which chromosomal abnormality in humans causes aggressive and antisocial behavior? [2010]

- A) XO  
B) XXY

C) XYY

D) XXX

35. Males with XYY chromosomes suffer from:

[2009]

- A) Klinefelter's Syndrome  
 B) Jacob's Syndrome  
 C) Down's Syndrome  
 D) Edwards's Syndrome

**APOPTOSIS/NECROSIS**

36. Cell death due to tissue damage is called:

- A) Necrosis  
 C) Apoptosis  
 B) Metastasis  
 D) Epistasis

37. Internal program of events and sequential morphological changes by which cell suicide is collectively called:

- A) Necrosis  
 C) Metastasis  
 B) Epistasis  
 D) Apoptosis

**KEY: Chapter 4: CELL DIVISION**

1. A	5. A	9. A	13. A	17. A	21. B	25. C	29. A	33. A	37. D
2. D	6. C	10. A	14. B	18. C	22. B	26. B	30. D	34. B	
3. C	7. B	11. D	15. B	19. D	23. C	27. C	31. D	35. B	
4. C	8. B	12. C	16. A	20. A	24. B	28. C	32. A	36. A	

KINGDOMS

taxonomy includes the arrangement of organisms into different taxa. Which of the following represents the correct hierarchy of various taxa of classification?

- [2019]
- Species, genus family, order class, phylum
  - Order, family, class, phylum, kingdom
  - Species, genus, order, family, class, phylum
  - Species, genus, family, class, order, phylum

KINGDOM PROTISTISTA

Fungi store surplus food in the form of:

- [2010]
- Cellulose
  - Glycogen
  - Starch
  - Both B and C

Trypanosoma is a human parasite causing:

- [2010]
- African sleeping sickness
  - European sleeping sickness
  - Indonesian sleeping sickness
  - American sleeping sickness

A large group of parasitic protozoa, some of which causes various diseases such as malaria to humans, are:

- [2009]
- Apicomplexans
  - Platyhelminthes
  - Annelida
  - Arthropods

KINGDOM FUNGI STRUCTURE

The giant amoebas inhabit mud at the bottom of fresh water ponds and obtain energy from:

[2009]

- Microscopic bacteria
- Aerobic bacteria
- Anaerobic bacteria
- Methanogenic bacteria

Which of the following components is more resistant to decay?

[2009]

- Lignin
- Starch
- Cellulose
- Cellulose

The African sleeping sickness is caused by

[2008]

- Trypanosoma histolytica
- Trypanosoma
- Zysoflagellates
- Ciliates

Economic Gains

8. Chitin, a chemical found in exoskeleton of arthropods is also found in cell wall of:

- [2017]
- Bacteria
  - Fungi
  - Cyanobacteria
  - Algae

MUTUALISM

9. Which of the following component is found in the cell wall of fungi?

- [2012]
- Cellulose
  - Proteins
  - Chitin
  - Glycerin

10. Mycorrhizae association is present in:

[2017-Retake]

- Fungi and green algae
- Fungi and roots of higher plants
- Fungi and cyanobacteria
- Fungi and dead human

11. The mutualistic association between certain fungi and roots of vascular plants is called

[UTIS-MODEL PAPER-2011]

- Lichens
- Parasitism
- Budding
- Mycorrhizae

Reproduction

12. In general, asexual reproduction is common in:

[2008]

- Humans
- Basidiomycota
- Deuteromycota
- Basidiospores

Classification

13. Yeast, the unicellular fungi belongs mostly to the group

[2018]

- Basidiomycota
- Deuteromycota
- Ascomycota
- Zygomycota

Life cycle of Rhizopus

14. In rhizopus, zygote forms temporary, dormant, thick-walled resistant structure called

[2015]

- Zygospore
- Spore
- Sporangia
- Hypha

15. Drugs obtained from fungus used for lowering blood cholesterol

[2010]

- Lovastatin
- Cyclosporin
- Ergotin
- Griseofluvin



16. The ecological role of fungi as decomposers is paralleled by:

- A) Protozoa [2010]  
B) Algae  
C) Bacteria  
D) Viruses

17. Penicillin is obtained from

- A) *Penicillium notatum* [2009]  
B) *Aspergillus flavus*  
C) *Aspergillus fumigatus*  
D) *Penicillium chrysogenum*

18. \_\_\_\_\_ are bio indicators of air pollution.

- A) Cyanobacteria [2009]  
B) Fungi  
C) Mycorrhiza  
D) Lichens

19. Which of the following is used for lowering blood cholesterol?(OR) Drug obtained from fungus used for lowering blood cholesterol is

- A) Lovastatin [2008,2010]  
B) Cyclosporin/Neurospora  
C) Ergotin/aspergillus  
D) Griseofluvin

#### Economic Losses

20. \_\_\_\_\_ is the yeast that grows in mucous membrane of mouth or vagina [2016]

- A) *Candida albicans*  
B) *Saccharomyces cerevisiae*  
C) *Aspergillus fumigatus*  
D) *Aspergillus flavus*

21. Athlete's foot is a disease caused by:

- A) Bacteria [2014]  
B) Virus  
C) Fungus  
D) Arthropod

22. Fungi which causes thrush in humans are:

- A) *Lovastatin* [2013]  
B) *Aspergillus fumigatus*  
C) *Saccharomyces*  
D) *Candidiasis*

23. Which one of the following fungi causes vaginal thrush?

- A) *Candida* [2011]  
B) *Aspergillus*  
C) *Tortula*  
D) *Penicillium*

24. The source of staple food for man are plants which belong to the family

- A) Mimosaceae [2014]  
B) Poaceae  
C) Rosaceae  
D) Fabaceae

25. The male reproductive part of the flower is called

- A) Gynaecium [2012]  
B) Calyx  
C) Androecium  
D) Corolla

26. The name *Nicotiana tabacum* is given to:

- (UHS-Model Paper-2011)  
A) Potato  
B) Tomato  
C) Red pepper  
D) Tobacco

27. Family Gramineae has:

- (UHS-Model Paper-2011)  
A) Only wheat  
B) Only corn  
C) Only rice  
D) All of above

28. Endosperm is formed as a result of:

- [2011]  
A) Pollination  
B) Self Pollination  
C) Double Fertilization  
D) Cross Pollination

29. Vascular system absent, gametophyte dominant, sporophyte attached to gametophyte, homosporous are distinguishing characters of:

- [2016]  
A) Psilopsida  
B) Pteropsida  
C) Angiosperms  
D) Bryophyta

30. Which of the following feature differentiate angiosperms from gymnosperms;

- [2010]  
A) Pollen disperse by air  
B) Haploid microspores  
C) Ovaries  
D) Pollen tubes

31. In Pakistan, the furniture wood is mainly obtained from the members of family;

- [2010]  
A) Rosaceae  
B) Solanaceae  
C) Mimosaceae  
D) Fabaceae

32. The gymnosperms are called 'Naked seeded' plants because they bear naked;

- [2009]  
A) Antheridia  
B) Ovules  
C) Fruits  
D) Archegonia

33. The integumented indehiscent megasporangium is called

- [2009]  
A) Seed  
B) Megagametophyte  
C) Archegonium  
D) Ovule

34. Pulses are present in family;

- [2009]  
A) Cuscutaceae  
B) Fabaceae  
C) Gramineae  
D) Mimosaceae

#### Kingdom Plantae

35. Which of the following are rootless sporophytes; [2008]

[www.chem.pk](http://www.chem.pk)

- Q. Name the class that contain seedless plants; [2008]
- B) Tracheophyta  
D) Sphenopsida
- B) Gymnospermae  
D) Phumae
- Q. The following does not belong to seedless plants; [2008]
- B) Poacea  
D) Fabacea

## Kingdom Animalia

## Basic Terminology

...ing group is the example of acelonates;

- {2018}**
- B) Molluscs**  
**D) Annelids**
- A) Platyhelminthes**  
**C) Aschelminthes**
- a radial symmetry, all body parts are arranged**  
**around the central axis. Radial symmetry**
- represents \_\_\_\_\_ mode of life**

- 2016
- B) streamlined  
D) parasitic

## Cnidarians

\_\_\_\_\_ is triploblastic organism;

- Q12999** Jellyfish  
B) Sea anemone  
D) Corals  
The cavity between body wall and alimentary canal

- 2013]
- A) Pseudocoelom  
B) Acoelom  
C) Coelom  
D) Gastro vascular cavity
- The layer which forms the lining of digestive tract and glands of digestive system is:

- A) Endoderm  
 B) Ectoderm  
 C) Mesoderm  
 D) Mesoglea

- Paracard system  
 Secondary canal lining  
 Molecular and skeletal system

- The nervous system develops from which of the following layer during embryonic development in animals:

NUMS and National AIDCAT by All Sudan  
A Message

45. (return to cavity lined by:

46. Which of the following is not a germ layer?  
 ( ) Ectoderm  
 ( ) Mesoderm  
 ( ) Endoderm  
 ( ) Entoderm

46. Which of the following do not have body cavity?
- A) Pseudocoelomates

- A) Pseudocyclopomatus  
Cyclopomatus

**PROFFRA**

4. Sponges which belong to phylum ceriaria have:

1115-Model Paper-2011

11. The Model T
- A) Maximum capacity
  - B) Very little capacity to regenerate
  - C) Moderate capacity to regenerate
  - D) No regeneration capacity

48. \_\_\_\_\_ is a good example of polymorphism: [2015]

- A) Hydra  
B) Star fish  
C) Obelia  
D) Funaria

49. Polymorphism is a feature exhibited by members of:

- A) Coelenterates  
B) Arthropoda  
C) Porifera  
D) Platyhelminthes

- 50. Polymorphism is characteristic feature of:** [2012]

51. Which of the following may build coral reefs along with coral animals?
- A) Porifera  
B) Cnidaria  
C) Annelida  
D) Nematodes

- A) Myxomycota  
B) Brown algae  
C) Green algae  
D) Red algae

## Platy helminthes

- 52. Snails are the intermediate hosts in:**

- A) Fasciola  
B) Taenia solium  
C) Schistosoma  
D) Ancylostoma duodenale

53. Taenia is an endoparasite of human, pig and cattle which belongs to phylum:

- which belongs to phylum \_\_\_\_\_
- A) Cnidaria  
B) Aschelminthes  
C) Annelida  
D) Platyhelminthes
54. Body of \_\_\_\_\_ consists of segments called proglottids which contain mainly sex organs:

- A) Planaria  
B) Liver fluke  
D) Tapeworm

ACARIS  
CAT in my Pocket (Our YouTube Channel)

Ali Series™

55. \_\_\_\_\_ is also called liver fluke;

[2015]

- A) Dugesia  
B) Fasciola  
C) Fasciola  
D) C. oral

56. Which one of the following is the primary host of liver fluke?

[2014]

- A) Man  
B) Sheep  
C) Snail  
D) Dog

57. Which one of the following is free living carnivorous flatworm?

[2014]

- A) Liver fluke  
B) Dugesia  
C) Tapeworm  
D) Schistosoma

58. When beef which is not properly cooked is consumed is by humans, they may become infected by:

[2013]

- A) Hook worm  
B) Pin worm  
C) Tape worm  
D) Round worm

59. Schistosoma is a parasite that lives in the \_\_\_\_\_ of its host:

[2013]

- A) Liver  
B) Blood  
C) Intestine  
D) Kidney

60. Fasciola is the name given to:

[2012]

- A) Tapeworm  
B) Pinworm  
C) Liver fluke  
D) Earthworm

61. The Platyhelminthes liver fluke is:

[UHS-Model Paper-2011]

- A) Fecoparasite in humans  
B) Blood parasite  
C) Parasite of respiratory tract  
D) Parasite in the bile duct

62. Fasciola is endoparasite of:

[2011]

- A) Colon  
B) Liver  
C) Small intestine  
D) Bile duct

63. It is an endoparasite of humans, cattle and pig that complete its life cycle in two hosts:

[2009]

- A) Tapeworm  
B) Aurelia  
C) Liver fluke  
D) Planaria

ASCHLELMINTHES

64. \_\_\_\_\_ is an intestinal parasite of man belonging to phylum nematode:

[2017]

- A) Taenia solium

B) Wuchereria bancrofti

C) Ascaris lumbricoidea

D) Schistosoma

65. Ascaris lumbricoidea is parasite of:

[2017 Punjab]

- A) Mouth  
B) Liver  
C) Intestine  
D) Lungs

66. \_\_\_\_\_ is a common parasite of the intestine of human and pig which belongs to phylum nematode; OR Name common gut roundworm parasite of human and pig:

[2015 &amp; 2016]

- A) Ascaris lumbricoidea  
B) Lumbricus terrestris  
C) Pheretima posthuma  
D) Hirudo medicinalis

67. Pseudocoelomates have a body cavity but it is not true coelom. Which one of the following is included in the group?

[2010]

- A) Planaria  
B) Tapeworm  
C) Earthworm  
D) Ascaris

68. Ascaris is which one of the following?

[2014]

- A) Ectoparasite  
B) Intestinal parasite  
C) Respiratory tract parasite  
D) Urogenital tract parasite

69. Ascaris is:

[2013]

- A) Diploblastic  
B) Triploblastic  
C) Haploid  
D) Acoelomate

70. Body cavity of round worms is called:

[2011]

- A) Pseudocoelom  
B) Coelom  
C) Acoelom  
D) Enteron

Annelida

No MCQ in Past Paper From This Part

ARTHIPODA

71. Growth in the larva of young arthropods is restricted by:

[2014]

- A) Appendages  
B) Exoskeleton  
C) Reduced mitosis  
D) Endoskeleton

72. Chitin which makes the Exoskeleton in insects further hardened by:

[2010]

- A) Protein and calcium carbonate  
B) Protein and potassium carbonate



Ali Series  
Sodium and sodium carbonate  
sodium and Sodium Bicarbonate  
the following stage of metamorphosis  
applies to its mother:

[2017 Retake]

- B) Nymph  
D) Pupa

in arthropods, the body cavity is in the form of:

[2015]

- B) Haemocoel  
D) Entelton

which of the following is of economic importance

[UHS-Model paper-2011]

- B) Milipede  
D) Scorpion

Malaria is transmitted in human beings by:

[2011]

- B) Anopheles  
D) tse-tse fly

tse-tse fly causes the sleeping sickness and skin

diseases by transmitting: OR Sleeping sickness in

humans is caused by:

[2009 & 2013]

- B) Aedes/Insects  
D) Plasmodium

book lungs are present in arthropods for exchange of

gases in class:

[2010]

- B) Insecta  
D) Arachnida

Name the class without antiehte :

[2008]

- B) Myriapoda  
D) Crustacea

Which of the following damages wooden ships?

[2008]

- B) Limax  
D) Ostrea

Which of which group are smaller to chordates?

[2010]

- B) Annelida  
D) Nematoda

Which of the following is exclusive character of

arthropods?

[2010]

- B) Hair

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C) Poikilothermic  
D) Four chambered heart

Name the vertebrates which are without jaws:

[2008]

- A) Osteichthyes  
B) Cyclostomata  
D) None of these

Sharks and rays are included in class:

[2008]

- A) Cyclostomata  
B) Chondrichthyes  
D) Tetrapods

Which of the following are called placental

mammals?

[2008]

- A) Prototheria  
B) Eutheria  
D) All of these

General Characteristic & Structure

Viruses

86. Capsid, the protective coat of a virus is made up of

subunits known as capsomeres:

[2019]

- A) Lipid  
B) Protein  
C) RNA  
D) DNA

87. In viruses, a combined structure formed by core

(Nucleic acid) and capsid is:

[2018]

- A) Nucleocapsid  
B) Envelope  
C) Capsomeres  
D) Prions

88. Cilia and flagella are absent in

[2017]

- A) Viruses  
B) Bacteria  
C) Higher plants  
D) Lower animals

89. Which one of the followings is a non-cellular

infections entity?

[2017]

- A) Mycoplasma  
B) Escherichia coli  
C) Herpes virus  
D) Diplococcus

90. What is size range of viruses:

[2017-Retake]

- A) 250nm to 200nm  
B) 250nm to 100nm  
C) 200nm to 20nm  
D) 250nm to 20nm

91. All viruses can reproduce within living organisms

only, so they are known as:

[2016]

- A) Ectoparasites  
B) Endoparasites  
C) Obligate intracellular parasites  
D) Facultative intracellular parasites

92. Viruses are simplest organisms and:

[UHS-Model Paper-2011]

- A) Have their own enzymes  
B) Have cell membrane but not cell wall  
C) Undergo cell division



D) Are only DNA or RNA particles without cellular structure

93. Chemically, viruses are made up of:

- [2011]  
A) Nucleic acid only B) Protein only  
C) Nucleic acid and protein D) Core and coat

#### BACTERIOPHAGES

94. Lysogenic viruses are also known as:

- [2018]  
A) Bacteriophage B) Enveloped phage  
C) Virulent phage D) Prophage

95. The viruses can reproduce:

- [2017]  
A) Without invading any cell  
B) In bacterial cell  
C) By mitosis  
D) By meiosis

96. The life cycle in which phage kills the bacteria is known as:

- [2017]  
A) Transduction B) Temperate phage cycle  
C) Lytic cycle D) Lysogenic phage cycle

97. What are the sequence of steps in which a bacteriophage attacks bacteria and injects its DNA?

- [2014]  
A) Landing Tail contraction penetration DNA injection  
B) Penetration Landing Tail contraction DNA injection  
C) Tail contraction Landing DNA injection penetration  
D) Landing Penetration Tail contraction DNA injection

98. The major cause of hepatitis B is:

- [2014]  
A) Blood transfusion B) Blood clotting  
C) Absence of fibrinogen D) Contaminated soil

99. Which one of the following diseases is caused by enveloped RNA virus and spread in epidemic form?

- [2011]  
A) Influenza B) Herpes simplex  
C) Polio D) Small pox

100. Which of the following is a blood borne disease?

- [2011]  
A) Hepatitis B) Cholera  
C) Influenza D) Candidiasis

101. Widespread epidemic disease, influenza is caused by:

- A) DNA virus B) RNA virus  
C) DNA enveloped virus D) RNA enveloped virus

102. Symptoms of Herpes simplex is:

- [2009]  
A) Abdominal Pain  
B) Fever  
C) Vesicular lesions in the epithelial layer  
D) Fall of immune system

103. Herpes simplex is caused by virus:

- [2009]  
A) Enveloped RNA B) Non-Enveloped RNA  
C) Non-enveloped RNA D) Enveloped DNA

104. Name the enveloped RNA virus that causes infection Hepatitis:

- [2009]  
A) HBV B) HAV  
C) HCV D) None of these

#### HIV & AIDS

105. Among following, enzyme is naturally found in human immunodeficiency virus (HIV)

- [2009]  
A) DNA polymerase B) RNA polymerase  
C) Reverse transcriptase D) Ligase

106. Reverse transcriptase is used to make DNA copies of:

- [2017-Retake]  
A) Host RNA B) Host DNA  
C) Viral DNA D) Viral RNA

107. AIDS is caused by:

- [2016]  
A) Bacteria B) Virus  
C) Fungi D) Alga

108. HIV is classified as:

- [2015]  
A) Bacteriophage B) Oncovirus  
C) Retrovirus D) Icosahedral virus

109. Which one of the following cells is mainly infected by HIV?

- [2014]  
A) T-killer lymphocytes B) T-helper lymphocytes  
C) B-plasma cells D) B-memory cells

110. Reverse transcriptase is used to make DNA copies of:

- [2011]  
A) Host RNA B) Host DNA  
C) Viral DNA D) Viral RNA

111. In HIV viruses, reverse transcriptase converts single stranded RNA into double stranded virus

[2012]

B) Duplication  
D) Reverse transcription

cell infected by the HIV is:

[2009]

B) Monocyte  
D) B lymphocyte

INFECTIOUS

ancient bacteria are:

[UHS-MODEL PAPER-2011]  
B) Archaeobacteria,  
D) Streptococci.

SHAPES

shaped bacteria are known as:

[2018]

B) Cocci  
D) Spirochaetes

one of the following shapes, gut living  
Escherichia coli is found?

[2017]

B) Oval  
D) Rod

Arrangement of coccus bacteria in chain is

[2017-Retake]

B) Staphylococci  
D) Sarcina

asked to give a guess about a  
organism with darkly stained nucleus,  
one of the following can be straight away

ated from the list :

[2017]

B) Amoeba  
D) Lactobacillus

the division of cells is in three planes, the  
element is known as

[2010]

B) Sarcina  
D) Staphylococcus

the following are spiral shaped bacteria?

[2008]

B) Bacilli  
D) Vibrio

FLAGELLA / PILI

bacteria are motile due to presence of:

[2016]

B) Pili  
D) Microtubules

CELL BIOLOGY

If lipopolysaccharides did not appear in the  
wall of bacteria on staining then it will be known as

A) Gram positive [2018]

B) Gram positive & gram negative  
C) Gram negative,  
D) Capsule

122. Find the characteristic true for Gram +ve  
bacteria:

A) Periplasmic space present in all [2017-Retake]

B) Less lipids than Gram -ve  
C) Two major layers  
D) Outer membrane present

123. Cell wall structure of a cell of unknown origin  
was studied and found to contain polysaccharide  
chain linked with short chain of amino acid. What  
do you think it can be?

A) Bacteria [2017]

B) Fungi cell  
C) Algae  
D) Cortex cell

124. Peptidoglycan or murein is a special or  
distinctive feature of cell wall in:

A) Algae [2014]

B) Fungi  
C) Bacteria  
D) Plants

125. Which statement about bacteria is true? [2013]

A) Gram positive bacteria have more lipids in their  
wall  
B) Gram negative bacteria have more lipids in their  
cell wall  
C) Lipids are absent in cell wall of both gram positive  
and gram negative bacteria  
D) Both have equal amount of lipids

# NUCLEOID

126. DNA molecule in prokaryotes is:

[2017-RETAKE]

A) Single, circular, double stranded molecule, not  
bounded by membrane  
B) Double, circular molecule  
C) Linear, double stranded molecule  
D) Single, circular, double stranded molecule,  
membrane bound

127. Nucleoid is a structure NOT found in:

[2017]

A) Campylobacter B) Cyanobacteria

[2013]

converts  
viral  
Channel)

DNA copies  
7-Retake]

[2016]

[2015]

[2014]

[2013]

- ( ) Spirochete
128. DNA of bacteria is present in: [2017-Retake]
- ( ) Nucleoid
- ( ) Mitochondria
129. The structure which contain the gene for drug resistance in bacteria are: [2011]

- ( ) Chromatin bodies
130. \_\_\_\_\_ are used as important vectors in genetic engineering. [2009]

- ( ) Plasmids
- ( ) Mesosomes

#### RIBOSOMES

131. Ribosomes present in prokaryotes are: [2017]

- ( ) 80S
- ( ) 50S

#### MESOSOMES

132. Functionally, mesosomes can be compared with: [2017]

- ( ) Ribosomes
- ( ) Polysomes

133. \_\_\_\_\_ is an invagination of cell membrane which helps in cell division: [2016]

- ( ) Fimbriae
- ( ) Mesosome

134. Mesosomes are infoldings of the cell membrane and are involved in: [2012]

- ( ) DNA replication
- ( ) Protein synthesis

135. Name the one involved in DNA replication: [2008]

- ( ) Cyst
- ( ) Ribosomes

#### CYSTOSPORES

136. During unfavorable conditions certain bacteria produce: [2015]

- ( ) Ribosomes
- ( ) Plasmids

#### NUTRITION

137. Name the nutrition resulted by feeding on dead and decaying matter: [2014]

- ( ) Penicillin
- ( ) Streptomycin

- ( ) Saprophytic
- ( ) Symbiotic

#### RESPIRATION

138. Binary fission is a characteristic cell division NOT found in: [2009]

- ( ) Pseudomonas
- ( ) Euglena

139. Name the structure in cyanobacteria which is helpful in fixing atmospheric nitrogen: [2009]

- ( ) Heterocyst
- ( ) Akinetes

140. Which of the following is aerobic bacterium? [2009]

- ( ) Spirochete
- ( ) E. coli

#### REPRODUCTION

141. Bacterial 'death rate' is equal to 'birth rate'. [2016]

- ( ) Lag phase
- ( ) Stationary phase

#### CONTROL

142. Treatment by using attenuated culture of bacteria is called. [2014]

- ( ) Chemotherapy
- ( ) Antisepsis

143. Pasteurization technique is widely used for preservation of [2013]

- ( ) Water
- ( ) Meat

144. The bacteria that cause diseases in human beings, are called: [2014]

- ( ) Photosynthetic bacteria
- ( ) Chemosynthetic bacteria
- ( ) Facultative bacteria
- ( ) Pathogenic bacteria

#### ANTIBIOTICS

145. Which one of the following antibiotic causes permanent discoloration of teeth in young children it is misused? [2014]

- ( ) Penicillin
- ( ) Streptomycin

146. Antibiotics are produced by fungi and certain bacteria of group:

- [2013]  
 A) Oomycetes  
 B) Ascomycetes  
 C) Actinomycetes  
 D) Basidiomycetes

147. Chemicals produced by microorganisms which are capable of destroying the growth of microbes are called:

- [2012]  
 A) Antigen  
 B) Bacteriocidal  
 C) Antiseptics  
 D) Antibiotics

148. Most wide spread problem of the antibiotic misuse is the:

[2012]

- A) Rapid cure  
 B) Disturbance of metabolite  
 C) Increased resistance in pathogens  
 D) Immunity
149. Antibiotics that kill microbes immediately are called:

[2011]

- A) Microbistatic  
 B) Microbicidal  
 C) Biostatic  
 D) Chemotherapeutic

150. Antibiotics act against:

[2009]

- A) Bacterial Diseases  
 B) Allergies  
 C) Bacterial and Viral Diseases  
 D) Viral Diseases

#### CYANOBACTERIA

151. Cyanobacteria are:

[2015]

- A) Photo autotrophic bacteria  
 C) Saprotrophic bacteria  
 B) Chemosynthetic bacteria  
 D) Parasitic bacteria

152. Name the cyanobacteria which are helpful in fixing atmospheric Nitrogen:

[2008]

- A) Heterocyst  
 B) Nostoc  
 C) Akinetes  
 D) Hormogonia

#### KEY - Chapter 5 Bio Diversity

1. A	17. A	33. B	49. A	65. C	81. C	97. C	113. C	129. A	145. D
2. B	18. D	34. B	50. B	66. B	82. A	98. A	114. B	130. D	146. D
3. D	19. A	35. A	51. A	67. A	83. D	99. A	115. A	131. B	147. C
4. A	20. A	36. D	52. A	68. D	84. B	100. A	116. D	132. D	148. D
5. D	21. C	37. A	53. D	69. B	85. B	101. A	117. A	133. B	149. B
6. C	22. D	38. A	54. D	70. B	86. B	102. B	118. D	134. C	150. B
7. B	23. A	39. A	55. C	71. A	87. B	103. C	119. B	135. A	151. A
8. B	24. B	40. C	56. B	72. B	88. A	104. D	120. D	136. B	152. A
9. B	25. C	41. C	57. B	73. A	89. A	105. D	121. A	137. D	
10. B	26. D	42. A	58. C	74. B	90. C	106. C	122. A	138. A	
11. D	27. D	43. C	59. B	75. B	91. D	107. D	123. B	139. A	
12. C	28. C	44. B	60. C	76. C	92. C	108. B	124. A	140. A	
13. A	29. C	45. A	61. D	77. D	93. D	109. C	125. C	141. D	
14. A	30. C	46. B	62. D	78. C	94. C	110. B	126. B	142. D	
15. A	31. C	47. A	63. A	79. D	95. D	111. D	127. A	143. D	
16. C	32. B	48. C	64. C	80. A	96. B	112. D	128. D	144. B	



## Chapter 6: Bioenergetics

## PHOTOSYNTHETIC PIGMENTS

1. The photosynthetic pigments of plants are arranged as clusters in thylakoid membranes. The reaction centers of these clusters consist of molecules.

A) ATP [2019]  
B) Chlorophyll  
C) Carotenes  
D) Starches

2. When we extract Carotenoids from its source, we see that it is:

A) Yellow to orange-red color [2018]  
B) Yellow-green color  
C) Blue-green color  
D) Violet color

3. Chlorophyll molecule contains:

A)  $Mg^{2+}$  [2017]  
B)  $Ca^{2+}$   
C) K  
D) Na

4. The tail of chlorophyll molecule is embedded in:

A) Membrane of mitochondria [2017]  
B) Thylakoid membrane  
C) Membrane of smooth endoplasmic reticulum  
D) Membrane of rough endoplasmic reticulum

5. Carotenoids absorb light of:

A) Yellow-orange range [2017]  
B) Yellow-red range  
C) Orange-red range  
D) Blue-violet range

6. Chlorophyll a and chlorophyll b differ from each other in only one of the functional groups; chlorophyll a has:

A) -CHO [2017]  
B) -OH  
C) -NH<sub>2</sub>

7. Pick the characteristic of tail of chlorophyll: [

A) Hydrophilic [2017-Retake]  
B) Hydrophobic  
C) Present in stroma  
D)  $C_{20}H_{40}$

8. Which of the following color is maximum absorbed by chlorophyll:

A) Red [2017-Retake]  
B) Green  
C) Yellow  
D) Indigo

9. Functional group of chlorophyll 'a' is:

A) -CH<sub>3</sub> [2016]  
B) -CHO  
C) -COOH  
D) -OH

10. Which part of chlorophyll molecule absorbs light [2013]

A) Phytol  
B) Porphyrin ring  
C) Pyrole  
D) Thylakoid membrane

11. Chlorophylls absorb mainly wavelength:

A) Yellow [2009]  
B) Green  
C) Violet-blue  
D) Indigo

## ABSORPTION AND ACTION SPECTRA

12. Graph showing effectiveness of absorbed light is called:

A) Absorption spectrum [2017-Retake]  
B) Action Spectrum  
C) Light spectrum  
D) Dark spectrum

13. Instrument which is used to measure relative abilities of different pigments to absorb different wavelengths of light is called:

A) Spectrometer [2010]  
B) Photometer  
C) Barometer  
D) Spectrophotometer

## PHOTOSYNTHESIS

## LIGHT DEPENDENT REACTION

14. In chemiosmosis the proton ( $H^+$ ) pumps move from:

A) Stroma to Lumen [2019]  
B) Stroma to cytoplasm  
C) Lumen to Stroma  
D) Cytoplasm to Stroma

15. Which of the following photosystem is involved in cyclic photophosphorylation?

A) PS I and PS II [2009]  
B) PS II  
C) PS III  
D) PS I

16. NADP, nicotinamide adenine dinucleotide phosphate, is a carrier of:

A) Hydrogen [2018]  
B) Phosphate  
C) -OH group  
D)  $O_2$  group

17. Splitting of water in sun light is called:

A) Lysis [2017-Retake]  
B) Condensation  
C) Photolysis  
D) Hydrolysis

18. Each \_\_\_\_\_ consists of a light gathering antenna complex and reaction center.

A) Chlorophyll [2016]  
B) Photosystem  
C) Photon  
D) Electron

19. Photosystem 'I' has chlorophyll 'a' molecules which absorb maximum light of:

[2016]

29. In light independent stage of photosynthesis the  $\text{CO}_2$  combines with \_\_\_\_\_ to form an unstable 6-carbon intermediate.
- A) Ribulose biphosphate  
B) Hexose sugar  
C) Glyceraldehyde 3-phosphate  
D) Glyceraldehyde 6-phosphate

30. Which of the following are the end products of light dependent stage, used in the Calvin cycle to change glyceraldehyde-3-phosphates into triose phosphates:
- A) NADPH + ATP  
B) NADP + ATP  
C) RuBP + ATP  
D) NADPH

31. Which of the following molecules is reduced by accepting hydrogen in Calvin Cycle?
- A) Glyceraldehyde 3-phosphate  
B) Ribulose biphosphate  
C) 3-Phosphoglycerate  
D) 1,3-Bisphosphoglycerate

### RUHS-MODEL PAPER 2011

32. In aerobic respiration:
- A) Pyruvate is completely oxidized to form oxygen and water  
B) Pyruvate is converted to ethanol and carbon dioxide  
C) Pyruvate carboxylate to produce citrate  
D) Pyruvate is completely oxidized to form carbon dioxide and water

33. A biochemical process which occurs within a cell to breakdown complex compounds to produce energy is called:
- A) Respiration  
B) Photosynthesis  
C) Oxidation reduction  
D) Photophosphorylation

34. Oxidative phosphorylation, synthesis of ATP in presence of oxygen, occurs in:
- A) All types of cells  
B) All anaerobic cells  
C) All primitive cells  
D) All aerobic cells

35. Type of respiration which involves step by step breakdown of carbon chain molecules in the cell is called as:
- A) External respiration  
B) Cellular Respiration  
C) Pulmonary Respiration  
D) Cutaneous Respiration

36. Type of respiration which involves step by step breakdown of carbon chain molecules in the cell is called as:
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- A) External respiration  
B) Cellular Respiration  
C) Pulmonary Respiration  
D) Cutaneous Respiration

37. Immediate source of energy for cellular metabolism is:

- A) Lipids  
B) ATP  
C) Carbohydrates  
D) Proteins

[2009]

## CYTOLYSIS

38. Glycolysis takes place in the \_\_\_\_\_ of cell.

[2019]

- A) Golgi complex  
B) Nucleus  
C) Cytoplasm  
D) Mitochondria

39. How many molecules of ATP would be utilized for phosphorylation of one glucose molecule during glycolysis?

- A) One  
B) Four  
C) Two  
D) Three

[2019]

40. The enzymes required in glycolysis are present in:

[2018]

- A) Golgi Apparatus  
B) Inner mitochondrial membrane  
C) Cell cytoplasm  
D) Matrix of mitochondria

41. At the last step of glycolysis which of the following compound is formed:

- A) Fructose phosphate  
B) Ethyl alcohol  
C) Pyruvic acid/Pyruvate  
D) Lactic acid

[2018]

42. Glycerate 3-phosphate in the presence of ATP and reduced NADP from light depended is reduced to:

[2017]

- A) 3 Carbon Compound  
B) Ribulose biphosphate  
C) 5 carbon compounds  
D) 6 carbon compounds

43. Glycolysis is conversion of:

[2017 Retake]

- A) Glucose to Acetyl CoA  
B) Glucose to G<sub>6</sub>P  
C) Glucose to pyruvate  
D) Glucose to Senné

44. In glycolysis, glyceralate 1, 3-bisphosphate is converted into glyceralate-3-phosphate by losing \_\_\_\_\_ Phosphate molecules:

[2015]

- A) 3  
B) 2  
C) 1  
D) 4

45. Oxidative phase of glycolysis starts with dehydrogenation of:

[2014]

- A) Glucose

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13) Fructose 6 phosphate

C) Glyceraldehyde 3 phosphate

D) NADH

46. Which one of the following is the stage of cellular respiration for which oxygen is not essential?

[2014]

- A) Glycolysis  
B) Pyruvate oxidation  
C) Krebs cycle  
D) Electron transport chain

47. The end product of glycolysis is:

[2012]

- A) ADP  
B) Reduced FAD  
C) Citric acid  
D) Pyruvate

48. Which of the following is not the end product of glycolysis:

[UHS-MODEL PAPER 2011]

- A) Pyruvate  
B) ATP  
C) Oxaloacetate  
D) reduced NAD

49. Glycolysis is the breakdown of glucose into two molecules of:

[2011]

- A) Glucerate  
B) Lactic acid  
C) Pyruvate  
D) Succinic acid

50. The molecule formed after first phosphorylation during glycolysis is:

[2009]

- A) Fructose-6-phosphate  
B) Fructose-1,6-bisphosphate  
C) Glucose-1-phosphate  
D) Glucose-6-phosphate

## PYRUVIC ACID OXIDATION

51. Pyruvate, the end product of glycolysis, moves from cytosol mitochondrial matrix where it is oxidized into \_\_\_\_\_ producing CO<sub>2</sub> as a by-product:

[2014]

- A) Acetic acid (active)  
B) Citrate  
C) NAD  
D) FAD

52. Pyruvate  $\longrightarrow$  Acetyl CoA

[2014]

- A) FAD  $\longrightarrow$  FADH  
B) NAD  $\longrightarrow$  NADH  
C) NADH  $\longrightarrow$  H  
D) FADH  $\longrightarrow$  H

53. Which of the following process does occur for the formation of acetyl Co-A from

[UHS-MODEL PAPER-2011]

- A) Decarboxylation  
B) Hydrogenation  
C) Carboxylation  
D) Deamination

54. Before entering into Krebs cycle, the pyruvate is first decarboxylated and oxidized into:

[2011]

- A) Alpha ketoglutaric acid  
B) Citric acid



## KREBS CYCLE

54. The enzymes required for Krebs cycle are found in [2018]

- A) Lysosomes  
B) Matrix  
C) Cytoplasm  
D) Fl particle

55. Acceptor of acetyl CoA in Krebs's cycle is; [2017-Retake]

- A) Oxaloacetate  
B) Citrate  
C) Succinate  
D) Fumarate

56. Malate is oxidized by \_\_\_\_\_ to oxaloacetate in Krebs cycle: [2015]

- A) ATP  
B) NADP  
C) NAD  
D) FAD

57. In one turn, the Krebs cycle produces one molecule of ATP. one molecule of  $FADH_2$  and \_\_\_\_\_ molecule/s of NADH; [2014]

- A) 1  
B) 2  
C) 3  
D) 4

58. Total NADH formed by one glucose molecule during Krebs cycle are: [2012]

- A) 6  
B) 3  
C) 8  
D) 18

59. One molecule of  $FADH_2$  is produced in Krebs cycle during conversion of: [2012]

- A) Fumarate  $\rightarrow$  Malate  
B) Succinate  $\rightarrow$  Fumarate  
C) Malate  $\rightarrow$  Oxaloacetate

D)  $\alpha$ -ketoglutarate  $\rightarrow$  Succinate

60. Krebs cycle in mitochondria takes place in: [2009]

- A) Cytosol  
B) Matrix  
C) Outer Membrane  
D) Inner Membrane

61. At the beginning of Krebs cycle, acetyl Co-A combines with which substance to form citrate (6-CP: [2009]

- A) Oxaloacetate  
B) Oxoglutarate  
C) Fumarate  
D) Succinate

62. In what stage of aerobic respiration are 2-carbon molecules oxidized completely to carbon oxide? [2008]

- A) Glycolysis  
B) ETC  
C) Krebs Cycle  
D) Calvin Cycle

## ELECTRON TRANSPORT CHAIN

64. In electron transport chain, the electrons from NADH and  $FADH_2$  are passed to: [2015]

- A) Cytochrome a  
B) Cytochrome a3  
C) Co-enzyme c  
D) Co-enzyme Q

65. Carriers of the respiratory chain are located on: [2015]

- A) Matrix of mitochondria  
B) Outer membrane of mitochondria  
C) Inner membrane of mitochondria  
D) Cytoplasmic matrix

66. Final acceptor of electrons in respiratory chain is: [2013]

- A) Cytochrome-A  
B) Oxygen  
C) Cytochrome-A3  
D) Cytochrome-C

67. Every molecule of NADH fed into electron transport chain produces: [2013]

- A) 6 ATP  
B) 2 ATP  
C) 4 ATP  
D) 3 ATP

68. The terminal electron acceptor in electron transport chain is: [2012]

- A) Hydrogen  
B) Iron  
C) Cytochrome  
D) Oxygen

## ANAEROBIC RESPIRATION AND ITS TYPES

69. The end product of anaerobic respiration in humans and other animals is: [2013]

- A) Pyruvic acid  
B) Ethanol  
C) Lactic acid  
D) Glucose

70. End products of yeast fermentation, bacterial fermentation and aerobic respiration are [2010]

- A) Citric acid, lactic acid, carbon dioxide and water  
B) Ethyl alcohol, citric acid and carbon dioxide  
C) Ethyl alcohol, lactic acid, carbon dioxide and water  
D) Methanol, lactic acid and citric acid

71. Which form of anaerobic respiration occurs in muscle cell of humans and animals does extreme physical activities? [2008]

- A) Lactic acid fermentation  
B) Alcoholic fermentation  
C) Glycolysis  
D) Pyruvic acid oxidation



## Key of CHAPTER 6: BIOENERGETICS

1. B	9. A	17. C	25. D	33. D	41. C	49. C	57. C	65. C
2. A	10. B	18. B	26. B	34. A	42. A	50. D	58. C	66. B
3. A	11. C	19. C	27. B	35. D	43. C	51. A	59. A	67. D
4. B	12. B	20. B	28. A	36. B	44. C	52. B	60. B	68. D
5. D	13. D	21. A	29. A	37. B	45. C	53. A	61. B	69. C
6. C	14. A	22. D	30. A	38. C	46. A	54. D	62. A	70. C
7. B	15. B	23. D	31. D	39. C	47. D	55. B	63. C	71. A
8. A	16. A	24. A	32. D	40. C	48. C	56. B	64. D	

## NUMS and National MDCAT by Ali Sudais

### Chapter 7- GASEOUS EXCHANGE

#### SYSTEM OF RESPIRATORY SYSTEM

air breathing air from pharynx enters in:

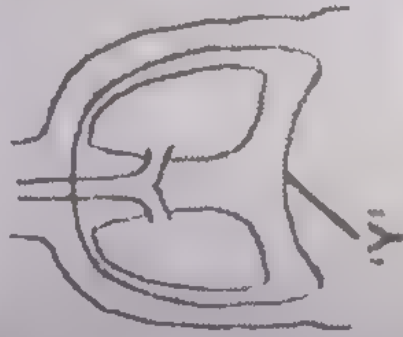
- [2018]  
 B) Bronchioles  
 D) Trachea

respiratory tubules are known as bronchioles when they attain the diameter of or lesser:

- [2017]  
 B) 1.0 cm  
 D) 1.2 mm

label the part 'Y' in the following diagram:

[2017]



- A) Pleura  
 B) Diaphragm  
 C) Oral cavity  
 D) Intercostal muscles

Site of gaseous exchange in humans is:

[2017-Retake]

- A) Trachea  
 B) Alveoli  
 C) Bronchus  
 D) Nose

air opening in the oral cavity (throat) through which air enters the wind pipe is called

[2011]

- A) Glottis  
 B) Bronchus  
 C) Larynx  
 D) Pharynx.

the double layer of thin membranes which line and cover lungs are called:

[2011]

- A) Pleural cavity  
 B) Alveoli  
 C) Pleura  
 D) Bronchioles

which one of the following acts as functional unit of lungs in man?

[2010]

- A) Air sac  
 B) Larynx  
 C) Trachea  
 D) Bronchioles

which of the following does not have specialized respiratory organs?

[2008]

- A) Hydra  
 B) Bird

#### MECHANISM OF BREATHING

9. During inspiration the space inside the chest cavity is increases due to

- [2019]  
 A) Increased pressure  
 B) The Relaxation of the muscle of the diaphragm  
 C) Relaxation of the external intercostal muscle  
 D) The contraction of the muscles of the diaphragm

10. Gaseous exchange in animals takes place with the help of process called

[2017-Retake]

- A) Active transport  
 B) Phagocytosis  
 C) Cyclosis  
 D) Diffusion

11. Breathing consists of:

[2016]

- A) Four phases  
 B) Three phases  
 C) One phases  
 D) Two phases

12. Expiration in human being carried out by

[2010]

- A) Contraction of Lungs  
 B) Contraction of intercostal membrane  
 C) Relaxation of intercostal and diaphragm Muscles  
 D) Contraction of diaphragm Muscles

13. Exchange of gases during organism respiration is carried out by:

[UHS MODEL PAPER 2011]

- A) Diffusion  
 B) Active Transport  
 C) Osmosis  
 D) Facilitated Diffusion

#### TRANSPORT OF OXYGEN AND CARBON

##### DIOXIDE

14. Carboxyhaemoglobin (10-20%) is formed when

CO<sub>2</sub> combines with:

[2016]

- A) Amino group of hemoglobin  
 B) Iron part of hemoglobin  
 C) Haem portion of hemoglobin  
 D) Plasma proteins

15. Low partial pressure of oxygen in tissues favors the \_\_\_\_\_ of oxyhemoglobin:

[2016]

- A) Dissociation  
 B) Formation  
 C) Stability  
 D) Transformation

16. About 70-85 % CO<sub>2</sub> in blood is carried

[2015]

- A) As carboxyhaemoglobin  
 B) With proteins in plasma  
 C) Freely as Co  
 D) As bicarbonate

17. Transportation of oxygen from lungs to the tissue cells is by means of:

- A) Complete blood  
C) Red blood cells

- B) Lymph  
D) White blood cells

[JHS MODEL PAPER 2011]

18. Which one of the following is directly proportional to oxygen carrying capacity of Hemoglobin?

[2010]

- A) Carbon dioxide (CO<sub>2</sub>)  
C) pH

- B) Temperature  
D) Light

19. Most of the carbon dioxide is carried by blood in form of:

[2009]

- A) Bicarbonate  
C) CO<sub>2</sub>

- B) Carboxyhaemoglobin  
D) Blood plasma proteins

20. When carbon dioxide pressure increases the capacity of hemoglobin to hold oxygen

[2008]

- A) Increases many folds  
C) Remains constant

- B) Decreases  
D) Is doubled

#### RESPIRATORY PIGMENTS

21. Which of the following statement is correct about respiratory pigments:

[2018]

- A) Albumin, Globulin and other proteins are present in respiratory pigments

- B) Myoglobin and Hemoglobin has higher affinity for nitrogen

- C) Myoglobin has more affinity for oxygen as compare to hemoglobin

- D) Carotene and Hemoglobin has low affinity for oxygen

22. The respiratory pigment which has much higher affinity to combine with oxygen, is:

[2009]

- A) Myoglobin

- C) Haemoglobin

- B) Globin  
D) Hemoxanin

#### LUNG CAPACITY

23. Exhaled air contain how much percentage of CO<sub>2</sub>:

[2017-Retake]

- A) 4

- C) 21

- B) 0.04  
D) 16

### Key of CHAPTER 7: GASEOUS EXCHANGE

1. D	5. C	9. D	13. A	17. C	21. C	25. D	29. C
2. C	6. C	10. D	14. A	18. C	22. A	26. D	30. D
3. B	7. A	11. D	15. A	19. A	23. A	27. C	31. A
4. B	8. A	12. C	16. D	20. B	24. B	28. D	

24. The total inside capacity of the lung is men:

[2011]

- B) 5 liters

- C) 6 " liters

- D) 2.5 liters

25. What is the residual volume of air which remains inside the lungs of human?

[2012]

- B) 1.5 liters

- C) 1.0 liters

- D) 1.5 liters

26. The total inside capacity of lungs of adult human beings when fully inflated is:

[2008]

- B) 50ml

- C) 500 ml

#### RESPIRATORY DISORDERS

27. A disease caused by gradual breakdown of the walls of alveoli is \_\_\_\_\_:

[2010]

- A) Tuberculosis

- B) Asthma

- C) Emphysema

- D) Bronchitis

28. Gradual breakdown of the alveolar wall results in which type of disease in a smoker?

[2010]

- A) Asthma

- B) Bronchitis

- C) Chronic heart disease

- D) Emphysema

29. The low level of Surfactant produced by Alveolar epithelial causes:

[2010]

- A) Emphysema

- Bronchitis

- B) Respiratory distress syndrome

- C) Asthma

30. Which one of the following is a respiratory disorder that is related to malnutrition?

[2017]

- A) Cancer

- B) Asthma

- C) Emphysema

- D) Tuberculosis

31. Breakdown of thin wall of alveoli occurs in:

[2017-Retake]

- A) Emphysema

- B) Cancer

- C) T.B

- D) Asthma

1. The major  
A) Destroy  
B) Release  
C) Inactive  
Transport  
2. Which one  
nucleus;

A) Eosinophils  
C) Basophils  
A type of blood  
A) Basophils  
C) Eosinophils

## NIMS and National MDCAT by Ali Sudani

### Chapter 8 Transport in Plants

#### Transport of Water and Minerals

Water and minerals move down their concentration gradient through plasmodesmata, cells of cortex, endodermis, pericycle and then to xylem in the xylem cells. This is also known as the:

[2019]

- A) Symplastic pathway
- B) Apoplastic pathway
- C) Transmembrane pathway
- D) None of these

#### Transpiration, Factors affecting it and opening and closing of Stomata

Four plants are present in different environmental conditions. Plant A is present in warm climate with abundant rainfall, plant B is present in a cool forest, plant C is present in warm climate with little breeze while plant D is present in warm climate with high wind speed. Which one of the above plants will have the highest rate of transpiration?

[2019]

- A) Plant B
- B) Plant D
- C) Plant A
- D) Plant C

[2018]

### Key of CHAPTER 8 TRANSPORT IN PLANTS

- 1. A
- 2. B
- 3. C

### Chapter 9: TRANSPORT IN HUMANS

#### BLOOD AND ITS COMPOSITION

1. The major function of Basophils to:

[2019]

- A) Destroy small particles by phagocytosis
- B) Release heparin to prevent blood clotting
- C) Inactivate inflammation producing substances
- D) Transport oxygen

2. Which one of the following cells does not have nucleus:

[2018]

- A) Eosinophils
- B) Platelets
- C) Neutrophils
- D) Monocytes

3. Type of blood cell that produces heparin is:

[2017]

- A) Neutrophils
- B) Eosinophils
- C) Monocytes
- D) Platelets

3. The attraction among water molecules which hold water together is called:

[2008]

- A) Tension
- B) Cohesion
- C) Adhesion
- D) Imbibition

4. The dew drops on tips of grass leaves in an example of:

[2008]

- A) Imbibition
- B) Bleeding
- C) Exudation
- D) Imbibition

#### Translocation according to Pressure Flow Theory

5. In plants, which sugar is transported from source to sink through sieve tubes?

[2019]

- A) Fructose
- B) Sucrose
- C) Glucose
- D) Starch

#### Xerophytes

6. Xerophytes have small thick leaves to:

[2019]

- A) Help them float on water
- B) Help them survive in salty environment
- C) Limit water loss by reducing the surface
- D) Limit water loss by increasing the surface

[2017]

4. Which of the following is agranulocyte cell?

[2017-Retake]

- A) Neutrophils
- B) Eosinophils
- C) Basophils
- D) Lymphocytes

5. Percentage of protein in human blood is:

[2017-Retake]

- A) 1-2
- B) 7-10
- C) 7-9
- D) 6-9

6. Granulocytes are:

[2015]

- A) Monocytes, Eosinophils, Basophils
- B) Basophils, Macrophages, Neutrophils
- C) Neutrophils, Lymphocytes, Basophils
- D) Monocytes, Macrophages, Basophils



7. Histamine is produced by which one of the following cells? [2014]

- A) Basophils  
B) Platelets  
C) Monocyte  
D) Eosinophils

8. Which one of the following is the most numerous/commonest of white blood cells? [2014]

- A) Eosinophils  
B) Monocytes  
C) Neutrophils  
D) Lymphocytes

9. Which one of the following proteins take part in blood clotting? [2014]

- A) Prothrombin  
B) Fibrinogen  
C) Immunoglobulin  
D) Globulin

10. The average life span of red blood cell is about: [2013]

- A) Four months  
B) Two months  
C) Five months  
D) One month

11. Mature mammalian red blood cells do not have: [2012]

- A) Nucleus  
B) Red colour  
C) Fluids  
D) Haemoglobin

12. In a normal person plasma constitutes about by volume of blood: [2012]

- A) 50%  
B) 60%  
C) 45%  
D) 55%

13. Which protein plays a major role in maintaining osmotic balance? [2011]

- A) Albumin  
B) Globulin  
C) Fibrinogen  
D) Prothrombin

14. The type of agranulocytes which stay in blood for few hours then enter the tissue and become macrophages are: [2011]

- A) Lymphocytes  
B) Monocyte  
C) Eosinophils  
D) Basophils

15. Heparin prevents blood clots and is released by: [2009]

- A) Eosinophils  
B) Monocytes  
C) Neutrophils  
D) Basophils

16. Granulocytes or white blood cells are produced in: [2010]

- A) Lymph nodes  
B) Red bone marrow  
C) Tonsils  
D) Spleen

#### STRUCTURE OF HEART

17. The thickest chamber of human heart is: [2018]

- A) Left Atrium  
B) Right Atrium

18. Bicuspid valve is present in which part of heart? [2017, NUMS]

- A) Right atrium and right ventricle  
B) Right atrium and left ventricle  
C) Left atrium and left ventricle  
D) Left atrium and right ventricle

19. Chordae tendineae are fibre cords attached with [2016]

- A) Cardiac end of stomach valve  
B) Tricuspid valve of heart  
C) Pyloric sphincter of stomach  
D) Eye lid

20. Bicuspid valve controls the flow of blood from: [2016]

- A) Right atrium to right ventricle  
B) Right ventricle to pulmonary artery  
C) Left ventricle to aorta  
D) Left atrium to left ventricle

21. In human the closed sac which surrounds the heart is: [2016]

- A) Endocardium  
B) Myocardium  
C) Pericardium  
D) Epicardium

22. Right atrium is separated from right ventricle by [2015]

- A) Bicuspid valve  
B) Semilunar valve  
C) Tricuspid valve  
D) Inter-atrial septum

23. The flaps of tricuspid valves are attached to the muscular extensions of right ventricle known as [2015]

- A) Smooth muscles  
B) Papillary muscle  
C) Inter-coastal muscle  
D) Skeletal muscles

24. Right atrium is separated from right ventricle by: [2013]

- A) Semilunar valve  
B) Tricuspid valve  
C) Bicuspid valve  
D) Septum

25. The right atrium of the heart usually receives the [2011]

- A) Deoxygenated blood  
B) Oxygenated blood  
C) Filtered blood  
D) Non-filtered blood

#### CARDIAC CYCLE

26. Which statement is correct about arterial stroke? [2018]

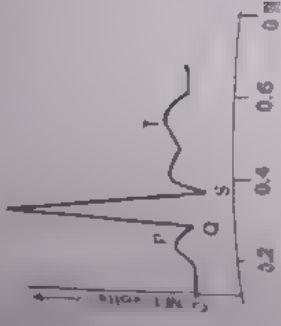
- A) Atria relax and ventricles contract  
B) Atria relax and ventricles also relax  
C) Atria and ventricles are relaxed  
D) Ventricles remain relaxed while atria contract

27. Which one of the following act as a PACE MAKER in Heart:

- A) Left Atrium  
B) Right Atrium

- 12018]
- A) Atrial ventricular node  
B) Atrial ventricular bundles of fibers  
C) Sino atrial node  
D) Bundle of His

38. In ECG, QRS wave represents:



- 12017]
- A) Ventricular systole  
B) Atrial systole  
C) Diastole  
D) Recovery systole

39. Cardiac cycle lasts about:

- [2017-Retake]
- A) 0.4 sec  
B) 0.8 sec  
C) 0.1 sec  
D) 0.5 sec

40. One complete heartbeat consists of one systole and one diastole and lasts for about:

- [2015]
- A) 0.8 sec  
B) 0.2 sec  
C) 0.4 sec  
D) 0.5 sec
41. The heart beat cycle starts when electric impulses are generated from:

- [2015]
- A) AV node  
B) SV node  
C) SA node  
D) PQ node
42. Which of the following statement best describes the function of sinoatrial node?

- [2009, 2010]
- A) It sends out electrical impulses to ventricles to contract.  
B) It is present at upper end of the left atrium.  
C) It consists of small number of diffusely oriented cardiac fibers.  
D) It sends out electrical impulses to atrial muscles causing both atria to contract.

### BLOOD CIRCULATION

43. The oxygenated blood from lungs to heart is transported by the

- [2017]
- A) Pulmonary artery  
B) Pulmonary vein  
C) Coronary artery  
D) Hepatic artery

44. Which vein has oxygenated blood?

- [2012]
- A) Renal vein  
B) Subclavian vein  
C) Pulmonary vein  
D) Jugular vein

### NUNS and National MDCAT by All Subjects

#### BLOOD VESSELS

35. Which of the following blood vessels contain semilunar valves?

- [2019]
- A) Arteries  
B) Arterioles  
C) Capillaries  
D) Veins

36. Elastic fibers are absent in the wall of:

- [2017]
- A) Aorta  
B) Arteries  
C) Capillaries  
D) Veins

#### ARTERIAL & CIRCULATORY DISORDERS

37. Arteriosclerosis:

- [2009]
- A) A metabolic disorder  
B) A degenerative Disorder  
C) An infectious disorder  
D) A nutritional deficiency disorders

#### LYMPHATIC SYSTEM

38. Large lymph vessels ultimately form larger lymph duct, which drains its lymph into:

- [2019]
- A) Carotid and Aorta  
B) Subclavian artery  
C) Subclavian Vein  
D) Aorta and Aorta

39. Thoracic lymph duct of the lymphatic system opens into:

- [2017]
- A) Superior vena cava  
B) Subclavian vein  
C) Inferior vena cava  
D) Renal vein

40. The lymphatic vessels of the body empty the lymph into the blood stream at the:

- [2013]
- A) Bile duct  
B) Abdominal vein  
C) Sub-clavian vein  
D) Jugular vein

41. Largest lymph duct called thoracic lymph duct drains into:

- [2011]
- A) Subclavian vein  
B) Renal vein  
C) Pulmonary vein  
D) Hepatic portal vein

42. The flow of lymph in lymphatic vessels is maintained by:


- [2010]
- A) Heart activity of smooth muscles and valves  
B) Activity of skeletal muscles, heart and breathing movements  
C) Breathing movements activity of skeletal muscles and valves  
D) Exercise, breathing movements and heart

## KEY OF CHAPTER 9, BLOOD AND ITS COMPOSITION

1. B	6. C	11. A	16. D	21. C
2. B	7. A	12. D	17. D	22. C
3. A	8. C	13. A	18. C	23. B
4. D	9. B	14. B	19. B	24. B
5. C	10. A	15. D	20. D	25. A

## Chapter 10 IMMUNITY

## IMMUNE SYSTEM &amp; ITS COMPONENTS

1. Thymus gland is involved in maturation of: [2018]  
 A) Platelets  
 B) Eosinophils  
 C) T-lymphocytes
2. Variable amino acid sequences in antibody molecules are found in: [2017]  
 A) Both light chains only  
 B) Both heavy chains only  
 C) One heavy and one-light chain  
 D) Both heavy and light chains
3. The antibody molecule consists of polypeptide chains: [2017]  
 A) Eight  
 B) Four  
 C) Six  
 D) Two
4. \_\_\_\_\_ cells survive for few days and they secrete huge number of antibodies in blood, tissue fluid or lymph: [2017]  
 A) Memory cells  
 B) Lymphocytes  
 C) T lymphocytes  
 D) Plasma cell
5. Diagram is given below find the variable region of antibody: [2017-Retake]
- 
- A) B  
 B) A  
 C) C  
 D) D
6. How many polypeptide chains are present in a typical antibody structure: [2017-Retake]  
 A) 1  
 B) 3  
 C) 2  
 D) 4

7. In antibody molecule, two heavy and two light chains are bonded by:  
 A) Disulphide bond  
 B) Monosulphide bond  
 C) Hydrogen bond  
 D) Ionic Bond
8. B-lymphocytes are named due to their relationship with:  
 A) Blood  
 B) Bursa of Fabricius  
 C) Bone marrow  
 D) Bile duct
9. Which part of antibody recognizes the antigen during immune response?  
 A) Heavy part  
 B) Light part  
 C) Constant part  
 D) Variable part
10. Which one of the following glands is involved in the production of lymphocytes?  
 A) Pituitary  
 B) Pituitary  
 C) Thymus  
 D) Adrenal
11. Antibodies are proteins and made up of how many polypeptide chains?  
 A) One  
 B) Two  
 C) Three  
 D) Four
12. Which part of antibody recognizes the antigen during immune response?  
 A) Heavy part  
 B) Variable part  
 C) Light part  
 D) Constant part
13. Two identical light chains and two identical heavy chains in antibody molecule linked by:  
 A) Disulfide (S-S) bridges  
 B) Peptide bond  
 C) Glycosidic bond  
 D) Ionic bond
14. In the structural diagram of an antibody molecule which portion is occupied by variable chains [2013]  
 A) Lower region  
 B) Upper region  
 C) Middle region  
 D) In between chains
15. Antibodies are produced against invading cells by: [2013]  
 A) Lower region  
 B) Upper region  
 C) Middle region  
 D) In between chains



[2013]  
 B) Eosinophils  
 D) Neutrophils  
 are produced by which of the following  
 [2012]  
 B) A lymphocytes  
 D) B and T lymphocytes  
 become mature and competent  
 after the influence of:  
 [2012]  
 B) Bursa of fabricius  
 D) Spleen  
 and mucous membranes are part of the body  
 defense system and they form the:  
 [2012]  
 B) Mechanical barriers  
 D) Biological barriers  
 and membranes are part of the body defense  
 system and they offer:  
 [2011]  
 B) Mechanical barriers  
 D) Biological barriers  
 is a foreign protein or any other molecule  
 that stimulates the formation of:  
 [2011]  
 B) Immunogens  
 D) Antibodies  
 lymphocytes and T-lymphocytes are formed:  
 [UHS-MODEL Paper-2011]  
 Before birth in bone marrow.  
 After birth in thymus gland.  
 After maturity in blood.  
 After birth in blood.  
 and agglutinins/ antibodies, two light chains  
 and heavy chains are linked to each other by:  
 [2011]  
 B) Hydrogen bonds  
 D) Ionic bonds  
 rejection is executed by  
 [2009]  
 B) Monocytes  
 D) T-lymphocytes  
 are actually:  
 [2009]  
 B) Glycoproteins  
 D) Glycolipids  
 chemical nature of antibody is:  
 B) Glycolipids  
 D) Polysaccharides

NUMS and National MDCAT by Ali Sudais  
 CELL-MEDIATED RESPONSE AND HUMORAL  
 IMMUNE RESPONSE  
 26. Cell mediated immune response is given by:  
 A) Neutrophils  
 C) Macrophages  
 B) T lymphocytes  
 D) B lymphocytes  
 27. B-cells release antibodies in blood plasma, tissue  
 fluid and lymph. This kind of immune response is  
 called:  
 B) Cell mediated response  
 C) Active response  
 D) Compound response  
 28. In \_\_\_\_\_ response, B-cells produce plasma  
 cells that synthesize antibodies and release in blood  
 plasma and tissue fluid:  
 A) Cell mediated response  
 B) Humoral immune response  
 C) Active immunity  
 D) Passive immunity  
 29. Response of body against transplanted organs is:  
 A) Homeostatic response  
 B) Behavioral response  
 C) Primary response  
 D) Cell mediated response  
 30. T-lymphocytes recognize antigen and attack  
 microorganisms or transplanted organs and  
 tissues. This effect is called:  
 A) Cell mediated response  
 B) Humoral immune response  
 C) Active immunity  
 D) Passive immunity  
 31. The immunity in which T cells recognize the  
 antigens or micro-organisms is known as:  
 B) Tissue grafting  
 C) Phagocytosis  
 D) Cell mediated immunity/ response  
 E) Humoral immunity/ response  
 32. Which chemicals are secreted by T-helper cells to  
 stimulate B-plasma cells to divide:  
 B) Interferons  
 C) Histamines  
 B) Cytokines  
 D) Fibrin

**TYPES OF IMMUNITY**

33. A person got an infection, he became ill but then he  
 survived. What do you think which type of  
 immunity he would have developed?



[2019]

- A) Naturally induced active immunity  
B) Artificially induced active immunity  
C) Active immunity  
D) Passive immunity

34. Anti-venom given after a snake bite venom is an example of:

[2018]

- A) Artificial active immunity  
B) Natural active immunity  
C) Artificial passive immunity  
D) Natural passive immunity

35. The immediate protection by infection of snake bite can be obtained by:

[2017]

- A) Active immunity  
B) Natural active immunity  
C) Passive immunity  
D) Vaccination

36. The type of immunity in which antibodies are passed from one individual to another is called as:

[2016]

- A) Passive immunity  
B) Artificial active immunity  
C) Natural active immunity  
D) Humoral immunity

37. To combat the active infections of tetanus, rabies and snakes the \_\_\_\_\_ method of immunization is used.

[2016]

- A) Active  
B) Humoral  
C) Active artificial  
D) Passive

38. Passive immunity is used against:

[2015]

- A) Malaria  
B) Typhoid  
C) Dengue  
D) Tetanus

39. Which type of immunity is achieved by injecting antibodies, antiserum, and anti-venom serum?

[2014]

- A) Active immunity  
B) Passive immunity  
C) Artificially induced immunity  
D) Naturally induced immunity

40. In passive immunity which of the following components are injected into the body?

[2013]

- A) Immunoglobulins  
B) Antigens  
C) Immunogens  
D) Saliva

41. Snake bite is treated with which type of immunization:

- A) Active  
B) Passive  
C) Humoral  
D) Specific

42. Which of the following is described as vaccination?  
[NIMS MODEL PAPER 2011]

- A) Artificial active immunity  
B) Natural active immunity  
C) Artificial passive immunity  
D) Natural passive immunity

43. The antibodies provided to infant through mother's milk is an example of:

[NIMS MODEL PAPER 20]

- A) Natural passive immunity  
B) Artificial passive immunity  
C) Natural active immunity  
D) Artificial active immunity

44. In passive immunity which of the following components are injected into the body:

[201]

- A) Antigens  
B) Immunogens  
C) Serum  
D) Immunoglobulins

45. Immediate protection is obtained from:

[2011]

- A) Passive immunity  
B) Active immunity  
C) Vaccination  
D) Natural active immunity

### VACCINATION

46. Now a days every new born gets regular shots of vaccine for polio. It \_\_\_\_\_ contains polio make a child immune against this disease.

[2018]

- A) Antiserum  
B) Antibodies  
C) Antibiotics  
D) Antigens

47. Vaccination is:

[2017-revise]

- A) Natural active immunity  
B) Natural passive immunity  
C) Artificial active immunity  
D) Artificial passive immunity

48. Treatment by using attenuated cultures of bacteria is called:

[2014]

- A) Chemotherapy  
B) Sterilization  
C) Antisepsis  
D) Vaccination

49. Which of the following diseases can be prevented through vaccination?

[2011]

- A) AIDS and cancer  
B) Malaria and AIDS  
C) Typhoid and cancer  
D) Measles and mumps

### Key: CHAPTER 10 IMMUNITY

1. D	3. D	5. D	7. B	9. C	11. D	13. C	15. A	17. C	19. A
2. D	4. C	6. A	8. D	10. D	12. B	14. B	16. A	18. A	20. D

24. B	27. B	30. A	33. A	36. A	39. B	42. A	45. A	48. D
25. A	28. C	31. C	34. C	37. D	40. A	43. A	46. D	49. D
26. B	29. D	32. B	35. C	38. D	41. B	44. D	47. C	

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## Chapter 11 HOMEOSTASIS

1. The process through which the body maintains its internal environment from the fluctuations of external environment are called as: [2013]  
 A) Homeostasis  
 B) Behaviour for organisms  
 C) Adaptation  
 D) Thermoregulation
2. Detections of change are signaling for effectors' response to the control system is a [2012]  
 A) Negative feedback  
 B) Positive feedback  
 C) Inter-coordination  
 D) Feedback mechanism
3. What are three components of mechanism of homeostatic regulation? [2012]  
 A) Receptors, control center and effectors  
 B) Sensory, motor and associative neurons  
 C) CNS, peripheral nervous system and diffused nervous system  
 D) Cerebrum Cerebellum and pons

## OSMOREGULATION

4. Keeping correct balance of lone and water in our body is called as: [2018]  
 A) Excretion  
 B) Thermoregulation  
 C) Osmoregulation  
 D) Selective reabsorption
5. The mechanism of regulation and its environment, of solute and the gain the loss of water is called as: [2017-Retake]  
 A) Thermoregulation  
 B) Osmoregulation  
 C) Excretion  
 D) Relaxation
6. \_\_\_\_\_ did not have the adaptations to remove the flooding of their cells in fresh water: [2008]  
 A) Euryphytes  
 B) Hydropytes  
 C) Xerophytes  
 D) Both A & C
7. How much water approximately is required to excrete 1 kg of ammonia nitrogen? [2008]  
 A) 500 ml  
 B) 5 liter  
 C) 300 liter  
 D) 500 liter
8. How many grams of nitrogen can be eliminated in the form of uric acid by 50 ml of water? [2008]  
 A) 20  
 B) 25  
 C) 30  
 D) 50

## THERMOREGULATION

NLMIS and National MDCAT by Ali Sudaki

9. Substances responsible for increasing the set point of the hypothalamus are called:  
 A) Peptin  
 B) Pyrogens  
 C) Prons  
 D) Androgens
10. All of the following are endotherms except: [2017-Retake]  
 A) Birds  
 B) Some fishes  
 C) Amphibians  
 D) Flying insects
11. Which of the following is exclusive character of mammals?  
 A) Home thermic  
 B) Hair  
 C) Poikilothermic  
 D) Four chambered heart
12. Hummingbirds belong to category:  
 A) Heterotherms  
 B) Endotherm  
 C) Ectotherms  
 D) None of these

## EXCRETORY STRUCTURES, PRODUCTS &amp; PROCESSES

13. The main nitrogenous excretory product of humans is: [2019]  
 A) Uric acid  
 B) Ammonia  
 C) Urea  
 D) Ammonium
14. Urea cycle is the detoxification of: [2018]  
 A) Carbon dioxide  
 B) Ammonia  
 C) Creatinine  
 D) Amino acids
15. Highly toxic nitrogenous excretory product is [2016]  
 A) CO<sub>2</sub>  
 B) Uric Acid  
 C) Urea  
 D) Ammonia
16. The removal metabolic waste from the blood is called as: [2016]  
 A) Thermoregulation  
 B) Osmoregulation  
 C) Kidney failure  
 D) Excretion
17. Which one of the following is the main nitrogenous waste product in humans? [2014]  
 A) Urea  
 B) Ammonia  
 C) Salts  
 D) Uric Acid
18. The central metabolic station and clearing house of a body is [2010]  
 A) Liver  
 B) Kidney  
 C) Nephron  
 D) Glomerulus
19. Metabolized waste from metabolism of nucleic acid is

A) Uric acid

[2010]

- B) Creatine  
D) Creatinine

Which one of these is an example of tubular secretory system called metanephridia?

- A) Planaria  
C) Cockroach

[2008]

- B) Hydra  
D) Earthworm

End product of hemoglobin breakdown is:

- A) Creatinine  
C) Hypoxanthine

[2008]

- B) Bilirubin  
D) Xanthin

### STRUCTURE & FUNCTION OF KIDNEY

The route of urine excretion from kidney to outside of body is:

[2019]

- A) Kidney ureter urinary bladder urethra  
B) Urinary bladder → kidney ureter → urethra  
C) Kidney ureter urethra → urinary bladder  
D) Kidney urethra urinary bladder-ureter

The muscles that control urine in bladder are known as

[2010]

- A) Striated muscles  
B) Smooth muscles  
C) Sphincter muscles  
D) Circular muscle

A central cavity of the kidney where urine is collected after filtration is known as:

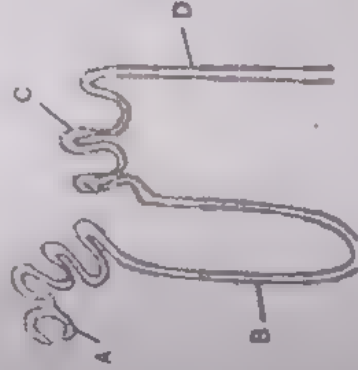
[2009]

- A) Ureter  
B) Pelvis  
C) Urethra  
D) Urinary Bladder

### NEPHRON

Given below is the diagram of nephron without vascular supply. What is the name of Part C?

[2019]



- A) Collecting tubule  
B) Proximal tubule  
C) Distal tubule  
D) Loop of Henle

The filtration is completed the waste products through distal tube of nephrons empties to:

[2018]

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- A) Proximal tubules  
B) Efferent Arterioles  
C) Peritubular capillaries  
D) Collecting tubules

The capillaries of glomerulus rejoin to form

[2018]

- A) Collecting duct  
B) Peritubular capillaries  
C) Afferent arteriole  
D) Efferent arteriole

Select the part of nephron which is NOT permeable to water and stops its outflow:

[2017]

- A) Glomerulus  
B) Proximal tubule  
C) Ascending loop  
D) Descending loop

The main factor in producing hypertonic urine is:

[2017]

- A) Glomerulus  
B) Influence of aldosterone  
C) Gradual decrease in osmolarity from cortex to inner medulla  
D) ADH influence on collecting duct

What is the least selective process during urine formation?

[2017]

- A) Reabsorption  
B) Pressure filtration  
C) Secretion  
D) Differential permeability

Bowman's capsule continues as extensively convoluted portion known as:

[2016]

- A) Peritubular capillaries  
B) Proximal convoluted tubules  
C) Efferent arterioles  
D) Afferent arterioles

Those nephrons which are present along the border of the cortex and medulla called:

[2015]

- A) Juxtamedullary nephrons  
B) Cortical nephrons  
C) Internal nephrons  
D) Outer nephron

When water is in short supply, increased water retention occurs through the:

[2015]

- A) Cortical nephrons  
B) Proximal convoluted tubule  
C) Juxtamedullary nephrons  
D) The tissue of cortex

Ascending loop of Henle does not allow outflow of:

[2015]

- A) Na<sup>+</sup> ions  
B) K<sup>+</sup> ions  
C) Cl<sup>-</sup> ions  
D) Water

Water and sodium ions are reabsorbed in:

[2015]

- A) Urinary bladder and urethra



B) Ureter

C) Adrenal cortex

43. Which one of the following is responsible for the production of concentrated urine? [2014]

A) Juxtamedullary nephrons

B) Cortical nephrons

C) Proximal tubule

D) Distal tubule

44. Reabsorption of useful constituents normally takes place in which one of the following? [2014]

A) Proximal tubule

B) Distal tubule

C) Bowman's capsule

45. Which one of the following parts of excretory system in humans acts as counter current multiplier? [2014]

A) Kidney

C) Medulla

B) Cortex

D) Loop of

[2013]

46. Site of filtration in nephrons is:

A) Proximal end and distal end

B) Ascending arm and descending arm

C) Loop of Henle

D) Glomerulus and Bowman's capsule

47. Active pumping out of Na<sup>+</sup> occurs at which part of nephron? [2013]

A) Proximal tubule

B) Ascending limb of loop of Henle

C) Descending limb of loop of Henle

D) Collecting Duct Henle

48. Maximum reabsorption takes place in which part of the nephron? OR In nephron, most of the reabsorption takes place in the: [2011 & 2012]

A) Distal tubule

B) Villi / descending limb

C) Cortical tissue/ ascending limb

D) Proximal tubule

49. Blood enters the glomerulus through: OR Vessels which carry blood to the glomerulus are called: [2012 & 20017]

A) Efferent arterioles

C) Vasa recta/ renal artery

50. Podocytes are present in:

A) Epithelium of renal capsule

B) Anti-diuretic hormone

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B) Endothelium of blood capillary

C) Basement membrane of blood capillary

D) Epithelium of the PCT

44. Which of the following are the functions of proximal convoluted tubule:

[UHS-MODEL PAPER-2011]

A) Ultrafiltration and reabsorption.

B) Selective reabsorption and retention of water

C) Selective reabsorption and active tubular secretion.

D) Reabsorption of water by the help of ADH

45. The walls of descending limb of loop of Henle are permeable to water as well as to sodium and chloride. [UHS-MODEL PAPER-2011]

A) Permeable to water but impermeable to salt

B) Permeable to water but impermeable to sodium and chloride.

C) Impermeable to both water and salts

D) Impermeable to both water and salts

46. The counter-current multiplier mechanism is shown by which of the following: OR In nephron, counter-current multiplier occurs at:

[UHS-MODEL PAPER-2011 & 2015]

A) Loop of Henle

B) Collecting duct/ Proximal convoluted tubule

C) Bowman's capsule

D) Glomerulus/ Distal convoluted tubule

47. Reabsorption of water by counter current multiplier mechanism takes place at:

[2011]

A) Proximal tubule

B) Distal tubule

C) Collecting duct

D) Loop of Henle

EFFECT OF HORMONES

48. When water content in body becomes high, what will happen? [2017]

A) ADH release will be inhibited

B) ADH will be released in large amount

C) Aldosterone will be released

D) Anterior pituitary will produce ADH

49. The concentration of sodium ions in body fluids is controlled by the hormone: [2016]

A) Renin

C) Angiotensin

B) Aldosterone

D) CPK

50. A hormone released from posterior pituitary lobe acts to actively transport water from filtrate in collecting tubules back to kidney is known as: [2016]

A) Renin

B) Anti-diuretic hormone

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D) Growth factor

quantity of dilute urine is produced in hyperlospidus. This disease due to deficiency of

and uretic Hormone B) Aldosterone  
D) Cortisol

Antidiuretic Hormone (ADH) is released from:

anterior pituitary lobe  
posterior pituitary lobe  
adipohypophysis

Antidiuretic hormone increases the reabsorption

B) Amino acids  
D) Ammonia

uptake of \_\_\_\_\_ in the ascending limb or  
loop of Henle is promoted by the action of

aldosterone: [2013]

B) Na  
D) Ca<sup>2+</sup>

Each portion of nephron is under the control of

ADH [2012]

Bowman's capsule

Ascending arm

Collecting and collecting ducts

Descending arm

Aldosterone play an important role in:

[2009]

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A) Transport of water  
B) Transport of K<sup>+</sup> ions into kidney  
C) Uptake of sodium in loop of Henle  
D) Reabsorption of water

57. ADH affects which of the following for retention of water:

A) Walls of collecting duct,  
B) Walls of loop of Henle  
C) Glomerulus  
D) Proximal convoluted tubule

58. Antidiuretic hormone helps in reabsorption of water by changing permeability of:

A) Proximal tubule B) Distal tubule  
C) Collecting tubule D) Loop of Henle

59. Aldosterone helps in conservation or active absorption of: [2011]

A) Sodium B) Calcium  
C) Potassium D) Bicarbonate ions

# KIDNEY PROBLEMS AND CURES

60. During peritoneal dialysis, the dialysis fluid is introduced into which part of human body? [2011]

A) Liver B) Abdomen  
C) Kidney D) Pancreas

61. Technique used for non-surgical removal of kidney stone is called: [2009]

A) Ultrasound B) Lithotripsy  
C) Dialysis D) X-ray

## Key of CHAPTER 11 HOMEOSTASIS

8. D	15. D	22. A	29. C
9. B	16. D	23. C	30. B
10. C	17. A	24. B	31. B
11. B	18. A	25. C	32. A
12. A	19. A	26. D	33. C
13. C	20. D	27. D	34. D
14. B	21. B	28. C	35. D

43. C	50. B	57. A
44. B	51. A	58. C
45. B	52. D	59. A
46. A	53. A	60. B
47. D	54. B	61. B
48. A	55. C	
49. B	56. C	

## Chapter 12: MUSCLES AND MOVEMENT

## HUMAN SKELETON

1. Skull, vertebral column, ribs and sternum forms: [2018]

- A) Hydrostatic skeleton  
B) Axial skeleton  
C) Exoskeleton  
D) Appendicular skeleton

2. Coccyx vertebrae are located in:

- A) Pelvic region [2018]  
B) Thoracic region  
C) Cervical region  
D) Lumber region

3. Scapula is a:

- A) Shoulder bone [2018]  
B) Skull bone  
C) Tail bone  
D) Hip bone

4. Spongy bone is always surrounded by:

- A) Compact bone [2017]  
B) Cartilage  
C) Osteoblast cells  
D) Osteoclast cells

5. The number of bones forming skull in man is:

- A) 8 [2017]  
B) 14  
C) 29  
D) 22

6. The spine consists of a linear series of:

- A) 33 bones [2017]  
B) 24 bones  
C) 12 bones  
D) 07 bones

7. Connective tissues which join muscles to bone are:

[20017-RETAKE]

- A) Ligaments  
B) Tendons  
C) RBC  
D) Osteocytes

8. Clavicle is the part of:

- A) Pectoral Girdle [20017-RETAKE]  
B) Pelvic Girdle  
C) Rib cage  
D) Vertebrae

9. Second vertebrae of Human vertebral column is called:

[20017-RETAKE]

- A) Atlas  
B) Axis  
C) Phalanges  
D) Tibia

10. Pectoral Girdle is the part of:

[20017-RETAKE]

- A) Appendicular skeleton  
B) Axial skeleton  
C) Skull  
D) Ribs

11. Longest bone in the human skeleton is:

[2016]

- A) Ulna  
B) Fibula  
C) Tibia  
D) Femur

12. In pelvic region of human body, sacrum is formed by the fusion of:

- A) 4 vertebrae [2016]  
B) 5 vertebrae  
C) 6 vertebrae  
D) 3 vertebrae

13. The total number of cervical and thoracic vertebrae in human vertebral column is:

- A) 7 [2016]  
B) 19  
C) 14  
D) 33

14. In a human vertebral column, the number of \_\_\_\_\_ vertebrae is 7:

- A) Cervical [2016]  
B) Thoracic  
C) Lumber  
D) Sacrum

15. Which one of the following structures holds the bones together?

- A) Mont's  
B) Cartilages  
C) Fibrous capsules  
D) Ligaments

16. Which one of the following cartilages is the most abundant in human body?

- A) Elastic cartilage [2016]  
B) Chondrus cartilage  
C) Fibrocartilage  
D) Hyaline cartilage

17. First vertebra of cervical region of vertebral column is known as:

- A) Axis [2013]  
B) Sacral  
C) Thoracic  
D) Atlas

18. Human and mammalian skeleton can be divided into two parts, axial skeleton and:

- A) Appendicular skeleton [2013]  
B) Exoskeleton  
C) Endoskeleton  
D) Hydrostatic skeleton

19. Last four vertebrae in humans are fused to form a structure called:

- A) Sacrum [2013]  
B) Cervical vertebrae  
C) Pubis  
D) Coccyx

20. How many bones are involved in the formation of each half of pelvic girdle?

- A) 3 bones [2013]  
B) 4 bones  
C) 2 bones  
D) 1 bone

21. The vertebral column consists of vertebrae:

[UHS-MODE PAPER 2011]



C) 28

D) 38

12. The living cells of cartilage are called as:

- A) Chondrocytes [2010]  
B) Osteoblasts  
C) Osteocytes  
D) Osteoclasts

13. The collagen fibers of bone are hardened by deposit of: OR Bone matrix is hardened by the:

- A) Haversian canals (aluminum carbonate) [2009 & 2017]  
B) Canaliculi (aluminum oxalate)  
C) Bone marrow tissue (Calcium bicarbonate)  
D) Calcium phosphate

14. Which of the following is made up of bones and cartilage?

- A) Endoskeleton [2008]  
B) Exoskeleton  
C) Hydrostatic skeleton  
D) None of these

### JOINTS & DISORDERS

15. Which combination is an example of ball and socket joints:

- A) Shoulder & knee joints [2018]  
B) Hip & elbow joints  
C) Hip & Knee joints  
D) Hip & shoulder joint

16. Hip and shoulder joints are examples of:

- A) Hinge joints [2016]  
B) Ball and socket joints  
C) Synovial joints  
D) Cartilaginous joints

17. The joint that allows the movements in several direction is called:

- A) Hinge joint [2013]  
B) Ball and socket joint  
C) Gliding joint  
D) Fibrous joint

18. The most abundant type of bone found on moveable joints is:

- A) Bone [UHS-MODE PAPER 2011]  
B) Hyaline cartilage.  
C) Fibro-cartilage.  
D) Bone and fibro-cartilage

19. Microcephaly, the small sized skull is due to:

- A) Nutritional Cause [2009]  
B) Skeletal Damage  
C) Hormonal Causes  
D) Genetic Defect

20. The joints that allow movements in several directions are:

- A) Hinge Joints [2009]  
B) Ball and Socket joints

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C) Fibrous Joints  
D) Cartilaginous joints

type of joints;

- A) Ball and socket [2008 & 2010]  
B) Pivot  
C) Hinge  
D) Fibrous

22. Which disease causes immobility and fusion of vertebral joint?

- A) Scleritis (Osteomylar (soft bones)) [2008 & 2010]  
B) Spondylitis  
C) Disc slip  
D) Rickets Arthritis

### TYPES OF MUSCLES

23. Lining of digestive system contain the:

[UHS-MODE PAPER 2011]

- A) Skeletal muscles  
B) Skeletal and cardiac muscles  
C) Cardiac muscles  
D) Smooth muscles

### ULTRASTRUCTURE OF MYOFILAMENTS

24. The thick filaments in a myofibril of muscles are made of

[2019]

- A) Haemoglobin  
B) Myoglobin  
C) Actin  
D) Myosin

25. Thin filaments of muscles contain \_\_\_\_\_ chains of actin molecules.

[2019]

- A) Four  
B) One  
C) Three  
D) Two

26. A sarcomere is the region of a myofibril between two successive:

[2015]

- A) M-lines  
B) Z-lines  
C) I-bands  
D) T-tubules

27. The sarcolemma of muscle fiber folds inwards and forms a system of tubes which runs through the sarcoplasm called:

[2015]

- A) Myofibril  
B) Sarcoplasmic reticulum  
C) T-tubules  
D) Transverse tubules

28. The repeated protein pattern of myofibril is called:

[2014]

- A) Sarcomere  
B) Zonere  
C) Sarcolemma  
D) Cross bridges

29. Each muscle fiber is surrounded by a membrane OR modified cell membrane called:

[2012 & 2016]

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- A) Sarcomere  
B) Sarcolemma  
C) Twitch fiber  
D) Capsule Myofibrilment

40. Diameter of skeletal muscle fiber is.

[UHS-MODE PAPER 2011]

- A) 2-50  $\mu\text{m}$   
B) 30-90  $\mu\text{m}$   
C) 10-100  $\mu\text{m}$   
D) 1-80  $\mu\text{m}$

41. Muscle is made up of many cells which are referred to as:

[2011]

- A) Myofibrilments  
B) Myofibrils  
C) Sarcolemma  
D) Muscle fiber

42. The length of the myofibril from one Z-band to the next is known as:

[2011 & 2013]

- A) Sarcomere  
B) Sarcolemma  
C) Sarcoplasm  
D) Muscle fiber

43. The pigment which stores oxygen in muscles is:

[2011]

- A) Haemoglobin  
B) Myoglobin  
C) Myosin  
D) Actinomyocosis

#### SUDING FILAMENT MODEL

44. The Function of Calcium ions in Muscle Contraction is to:

[2019]

- A) Bind to troponin molecule and cause them to move  
B) Aid in the transmission of nerve impulse  
C) Polarize visible light  
D) Bind to tropomyosin molecule and cause them to form cross bridges

45. Which one of the following changes occurs when skeletal muscle contracts?

[2017]

- A) I-band shortens only  
B) A-band shortens and Z line moves farther apart  
C) I-band shortens and Z lines get closer  
D) Actin filament contracts

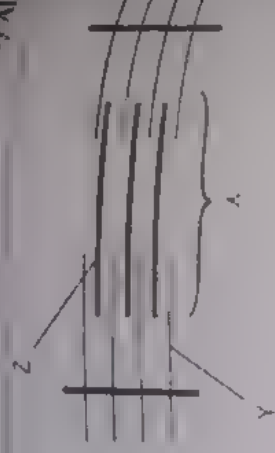
46. Over lapping of thick filament occurs in:

[2017-Retake]

- A) A Band  
B) I Band  
C) M line  
D) Z line

47. Where can we find H-zone in the figure of fine structure for skeletal muscle's myofibril?

[2013]



KEY: X= A-band, Y= Actin, Z= Myosin

- A) In the mid of "A-band".  
B) In "I-band"  
C) Besides the "Z line"  
D) Along the "I-band".

48. When calcium ions are released from the sarcoplasmic reticulum they bind with \_\_\_\_\_ during muscle contraction.

[2011, 2012 & 2013]

- A) Tropomyosin  
B) Sarcolemma  
C) Cytosol's ions / Myosin  
D) Troponin

49. During muscle contraction OR

According to sliding filament theory, when muscle fibers are stimulated by nervous system, which of the following changes occurs?

[2010 & 2015]

- A) I-band shortens  
B) H-zone becomes more visible/ Myosin filaments shorten  
C) Z-lines move further apart/actin filaments shorten  
D) A-bands broaden/Z-line disappears

#### SOURCES OF ENERGY FOR MUSCLE CONTRACTION

50. When more energy is required in muscle contraction then that energy can also be produced by \_\_\_\_\_ as a secondary source:

[2014]

- A) Glucose  
B) Phosphocreatine  
C) Fructose  
D) Lactic acid

#### PHYSIOLOGICAL INABILITIES OF MUSCLES

51. If lactic acid builds up in thigh muscles, it causes muscle tiredness and pain. This condition is called \_\_\_\_\_

[2015]

- A) Muscle fatigue  
B) Tetany  
C) Cramps  
D) Oxygen debt in muscles

52. Muscle fatigue is due to accumulation of:

[UHS-MODE PAPER 2011]

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(C) Cramp

D) Tetanus

54. Which disease is caused by low calcium level in blood?

A) Tetany

(C) Muscle fatigue

B) Cramp

D) Sciatica

[2008]

B) Muscle fatigue

[2011]

A) Tetany

## CHAPTER 12

### MUSCLES AND MOVEMENT

7. B	13. B	19. D	25. D	31. B	37. D	43. B	49. A
8. A	14. A	20. A	26. B	32. B	38. A	44. A	50. D
9. B	15. B	21. A	27. B	33. D	39. B	45. C	51. A
10. A	16. B	22. A	28. B	34. D	40. C	46. A	52. A
11. B	17. B	23. D	29. D	35. D	41. D	47. A	53. B
12. B	18. A	24. A	30. B	36. B	42. A	48. D	54. A

## Chapter 13: COMMUNICATION

### NERVOUS SYSTEM NERVOUS SYSTEM COORDINATIONS IN MAMMALS

#### CENTRAL NERVOUS SYSTEM

1. Humans have homeostatic thermostat present in a specified portion of the brain that is:

[2017]

- A) Lateral ventricle  
B) Thalamus  
C) Spinal cord  
D) Hypothalamus

2. The CNS is protected by

[2017]

- A) Three layers of meninges  
B) One layer of meninges  
C) Four layers of meninges  
D) Two layers of meninges

3. White matter of spinal cord is made up of:

[2017]

- A) Sensory nerve fibers  
B) Myelinated nerve fibers  
C) Motor nerve fibers  
D) Mixed nerve fibers

4. Band of axons between two hemispheres is called:

[2017-RETAKE]

- A) Corpus callosum  
B) Corpus uterum  
C) Synapsis  
D) Synapse

5. Reflexes of eyes is detected by which part of brain:

[2017-RETAKE]

- A) Mid brain  
B) Fore brain  
C) Hind Brain  
D) Cerebral hemisphere

6. Spinal cord is protected by how many layers of meninges:

[2017-RETAKE]

- A) 1  
B) 2  
C) 3  
D) 4

7. Brain is protected and enclosed in:

[2016]

- A) Lumbar vertebrae  
B) Coccyx  
C) Vertebral column  
D) Cranium

8. The right and left cerebral hemispheres are connected by a thick band of nerve fibers called:

[2014]

- A) Midbrain  
B) Corpus callosum  
C) Pons  
D) Medulla

9. The part of the brain which guides smooth and accurate motions and maintains body positions is called as:

[2014]

- A) Cerebrum  
B) Cerebellum

10. Part of hind brain responsible for the balance and equilibrium of body is called:

- A) Medulla  
B) Cerebellum  
C) Pons  
D) Thalamus

11. Thalamus and cerebrum are the part of:

[2014]

- A) Spinal cord  
B) Forebrain  
C) Hind brain  
D) Mid brain

12. The part of brain which controls breathing, brain rate and swallowing is:

[2012]

- A) Cerebrum  
B) Cerebellum  
C) Medulla  
D) Hypothalamus

13. Respiratory centre is located in:

[2014]

- A) Cerebrum  
B) Cerebellum  
C) Medulla  
D) Hypothalamus

14. It controls the several automatic functions like breathing, heart rate and blood pressure:

[2008]

- A) Midbrain  
B) Pons  
C) Medulla  
D) Cerebellum

#### PERIPHERAL NERVOUS SYSTEM

15. Which one of the following is the effect of sympathetic nervous system?

[2014]

- A) Constriction of bronchi  
B) Decrease in heart rate  
C) Promotes digestion or peristalsis  
D) Dilates the pupil

16. The number of cranial nerves in humans is:

[2012]

- A) 31 pairs  
B) 12 pairs  
C) 24 pairs  
D) 62 pairs

17. A mix nerve consists of:

[UHS-MODEL PAPER-2011]

- A) Motor and sensory nerve fibers.  
B) Sensory and associative nerve fibers  
C) Motor and associative nerve fibers  
D) Dendron's and dendrites

18. Over-activity of sympathetic nervous system causes:

[2011]

- A) Disturbance of vision  
B) Constipation  
C) Decrease in blood pressure

increase in the Heart Rate

## RECEPTORS, NEURONS & IFS TYPES

(Sensory, Intermediate / relay and motor neurons)

Which of the following produce response:

- A) Effectors [2018]  
B) Stimulators  
C) Nerve  
D) Brain

How many sodium ions are pumped out in response to two potassium ions transported into the membrane:

- A) 4 [2018]  
B) 2  
C) 1  
D) 3

Taste buds on the tongue are example of:

- A) Thermo-receptors [2018]  
B) Photoreceptors  
C) Pressure receptors  
D) Chemoreceptors

Pick out the pressure receptors:

- [2017-RETAKE]  
A) Chemoreceptors  
B) Mechanoreceptors  
C) Photoreceptors  
D) Thermo-receptors

The structures which respond when they are stimulated by impulse coming through motor neuron are:

- [2013]  
A) Receptors  
B) Responses  
C) Effectors  
D) Transducers

The part of neuron fiber which conducts nerve impulses away from the cell body is:

- [2012]  
A) Dendron  
B) Dendrites  
C) Axon  
D) Peripheral branch

Mechanoreceptors detect stimulus of:

[UHS-MODEL PAPER-2011]

- A) Smeil  
B) Light  
C) Pressure (touch).  
D) Cold and warmth

The effectors in the human body which respond to a stimulus are:

[UHS-MODEL PAPER-2011]

- A) Glands only.  
B) Muscles only.  
C) Both muscles and glands.  
D) Bones

Which structures respond when they are stimulated by impulse coming through motor neuron?

[2011]

- A) Receptors  
B) Responses  
C) Effectors  
D) Transducers

Which of the following receptor produce sensation of pain?

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- A) Mechanoreceptors [2008]  
B) Nociceptors  
C) Chemoreceptors  
D) Thermoreceptors

When your finger accidentally gets caught in the door, the pain message is sent to your brain through:

- A) Associative neuron. [2008]  
B) Sensory neurons  
C) Motor neurons  
D) The medulla

## REFLEX ARC REFLEX ACTION

The reflex action is the phenomena which only involves:

[2019]

- A) Brain, receptors, spinal cord  
B) Receptors, effectors and spinal cord  
C) Receptors, neurons, brain  
D) Receptors and effectors

## NERVE IMPULSE

If stimulation is above \_\_\_\_\_ impulses travel to the brain along the sensory neuron.

[2019]

- A) Action Potential  
B) Threshold  
C) Resting Potential  
D) Recovery Period

In an action potential, the permeability of sodium ions in the neuron increases due to:

[2019]

- A) Repolarization  
B) The opening of sodium channels gates  
C) The action of the acetylcholinesterase enzyme  
D) Sodium ions forming and ionic bonding.

When a nerve impulse jumps from one node of Ranvier to the next in a myelinated

neuron, it's called:

[2018]

- A) Salutatory conduction  
B) Synapses  
C) Resting Potential  
D) Membrane Potential

The nerve impulse which jumps from node to node in myelinated neurons is:

[2017]

- A) Resting membrane potential  
B) Saltatory nerve impulse  
C) Threshold stimulus  
D) Initial nerve impulse

Conduction of action potentials from one node of Ranvier to another in myelinated neurons is through:

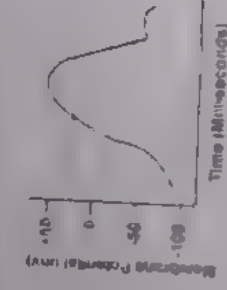
[2015]

- A) Hyperpolarization  
B) Resting membrane potential



- (C) Depolarization  
D) Saltatory conduction

36. In the following diagram of action potential in a neuron, "x" depicts:



[2015]

- A) Depolarization  
B) Polarization  
C) Repolarization  
D) Hyperpolarization

37. A typical neuron at rest

[2010]

- A) Is more positive outside than inside  
B) Is more negative outside than inside  
C) Has no charge on either side  
D) Has an equal charge on either side

38. Which one of the following conditions best describes active membrane potential:

[2009]

- A) ++++++outside

.....  
Inside Neuron

- B) ++++++outside

+++++  
Inside Neuron

- C) ++++++outside

.....  
Inside Neuron

- D) .....outside

+++++  
Inside Neuron

### SYNAPSE

39. Acetylcholine and noradrenaline are two types of \_\_\_\_\_ used in our nervous system:

[2019]

- A) Hormones  
B) Channel and carrier proteins in the cell membrane of neuron.  
C) Enzymes.  
D) Neurotransmitters

40. The main neurotransmitter for synapses is \_\_\_\_\_ which lie outside the central nervous system:

[2019]

- A) Choline  
B) Acetylcholine  
C) Acetaldehyde  
D) Phosphatidylcholine

41. In nervous system Chemical messengers are called:

- A) Enzymes  
B) Neurotransmitters  
C) Chemoreceptors  
D) Hormones

42. Neurotransmitter secreted at synapse outside the central nervous system is:

- A) Dopamine  
B) Polypeptide  
C) Androgen  
D) Acetylcholine

43. Which of the following neurotransmitters lie outside the central nervous system?

- A) Serotonin  
B) Dopamine  
C) Acetylcholine  
D) Adrenaline

### NERVOUS DISORDERS

44. A neurological disorder characterized by the decline in brain function is \_\_\_\_\_ symptoms are similar to those diseases that cause dementia:

[UHS-MODEL PAPER 2011, 2015, 2016]

- A) Parkinson's disease  
B) Epilepsy  
C) Alzheimer's disease.  
D) Grave's disease

45. There is evidence that high levels of Aluminium may contribute to the onset of:

[2014, 2017]

- A) Parkinson's Disease  
B) Alzheimer's disease.  
C) Lesh-Nyhan Syndrome  
D) Fragile X-syndrome

- A) Epilepsy  
B) Parkinson's disease  
C) Alzheimer's disease  
D) Huntington's disease

47. The disease in which death of small number of cells in the basal ganglia leads to inability to select and initiate patterns of movement is known as:

[2016]

- A) Fever  
B) Alzheimer's disease  
C) Epilepsy  
D) Parkinson's disease

48. There is also evidence that high levels of \_\_\_\_\_ contribute to the onset of Alzheimer's disease:

[2013]

- A) Ca  
B) Mg  
C) MO  
D) Al

49. L-dopa or levodopa is used to get some relief from:

[2013]

- A) Epilepsy  
B) Parkinson's disease

59. Which group of hormones is made up of amino acids and their derivatives?

- A) Vasopressin and antidiuretic hormone  
B) Epinephrine and nor epinephrine  
C) Estrogen and testosterone  
D) Insulin and glucagon

[2011]

60. Hormones are the organic compounds of varying structural complexity. Which of the following is not a function or property of these compounds?

- A) They initiate new biochemical reactions  
B) They are poured directly into blood  
C) They may be proteins  
D) They affect target cells

[2010]

61. Which one of the following is a precursor of steroid hormones?

- A) Glycerol  
B) Sterol  
C) Amino acids  
D) Cholesterol

[2010]

### HYPOTHALAMUS & PITUITARY GLAND

62. \_\_\_\_\_ hormone is released from posterior lobe of pituitary gland:

- A) Thyroid stimulation hormone  
B) Adrenaline  
C) FSH  
D) Antidiuretic hormone

[2018]

63. Blood solute potential is controlled by following hormone:

- A) Vasopressin  
B) Thyroxine  
C) Epinephrine  
D) Estrogen

[2018]

64. All the hormones released by anterior pituitary are tropic EXCEPT:

- A) Thyroid stimulating hormone  
B) Somatotrophic hormone  
C) Adrenocorticotrophic hormone  
D) Gonadotrophic hormone

[2017]

65. Ejection of milk from mammary glands is under the control of which one of the following hormones?

- A) Androgen  
B) Oxytocin  
C) Progesterone  
D) Estrogen

[2015]

66. The gonadotrophic hormones of anterior lobe of pituitary include:

[2014]

A) Prolactin, Thyroid stimulating hormone,

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[2012]

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[2014]

A) Prolactin, Thyroid stimulating hormone,

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- sonatrophin hormone  
 B) Follicle stimulating hormone, Luteinizing hormone, Prolactin  
 C) Adrenocorticotrophic hormone, Luteinizing hormone, Follicle stimulating hormone  
 D) Luteinizing hormone, Follide stimulating hormone, Thyroid stimulating hormone
67. Hormones secreted by anterior pituitary and which control the secretions of hormone other endocrine glands are known as:

- A) Release factor [2013]  
 B) Inhibitor  
 C) Accelerator  
 D) Tropic or trophic hormone

68. Vasopressin and oxytocin are released from the

- A) Placenta [2012]  
 B) Ovary  
 C) Anterior pituitary  
 D) Posterior pituitary

69. Neurosecretory cells are present in which part of brain?

- A) Hypothalamus [2011]  
 B) Hindbrain  
 C) Pons  
 D) Cerebellum

70. Which hormone continues to promote protein synthesis throughout the body even after the cease in growth?

- A) IGH [2008]  
 B) ADEL  
 C) ADEL  
 D) IGH

#### THYROID AND PARATHYROID GLAND

71. Parathormone hormone production is controlled by the blood:

- A) Sugar level [2018]  
 B) Ca level  
 C) Na level  
 D) Mg level

72. The thyroxine hormone of thyroid gland acts directly on:

- A) Kidney metabolism [2017]  
 B) Protein metabolism  
 C) Glucose metabolism  
 D) Basal metabolic rate

73. Deficiency of thyroxine in children causes:

- A) Cretinism [2017-RETALE]  
 B) Graves disease  
 C) Addison disease  
 D) Cushing disease

74. Thyroxine deficiency in adults results in a condition called:

- A) Cretinism [2015]  
 B) Hypothyroidism  
 C) Thyrotoxicosis  
 D) myxedema

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75. How many iodine atoms are present in thyroxine?

- A) 3 [2014]  
 B) 2  
 C) 4  
 D) 5

76. The hormone called Parathormone regulates calcium level in the blood. This is produced by:

[UHS-MODEL PAPER 2011]

- A) Gonads  
 B) Pituitary  
 C) Thyroid gland  
 D) Parathyroid

#### ADRENAL GLAND

77. The central portion of adrenal gland (adrenal medulla) produces hormone.

- A) Aldosterone [2016]  
 B) Epinephrine  
 C) Androgen  
 D) Corticosterone

78. \_\_\_\_\_ hormones are called fight and flight hormones as they prepare an organism to face stressful situation:

- A) Adrenaline, aldosterone [2016]  
 B) Epinephrine, norepinephrine  
 C) Cortisone, oxytocin  
 D) Thyroxine, nor-epinephrine

79. Which of the following hormone is antagonistic to insulin?

- A) Thyroxine [2017-Retake]  
 B) Cortisol  
 C) Gastrin  
 D) Secretin

80. A hormone which controls the uptake of sodium ions in kidney and its maintenance in blood pressure.

- A) Gonadotrophic [2018]  
 B) Somatotrophic Hormone  
 C) Thyroxine Hormone  
 D) Aldosterone Hormone

#### ISLETS OF LANGERHANS

81. Which one of the followings is exocrine as well as endocrine?

- A) Liver [2017]  
 B) Adrenals  
 C) Thyroid  
 D) Pancreas

82. \_\_\_\_\_ hormone is antagonistic to insulin and causes increase in blood glucose level.

- A) Glucagon [2016]  
 B) Nor-epinephrine  
 C) Calcitonin  
 D) Thyroxine

83. Beta cells of islets of Langerhans produce hormone.



B) Insulin [2016]

1) Parathormone  
secreted by the cells of islets of Langerhans

B) Insulin [2015]  
D) Renin

cells of islets of Langerhans secrete hormone called:

B) Insulin [2013]  
D) Aldosterone

which of the following is the function of glucagon hormone?

[2013]

Glucose → Lipids  
Glucose → Proteins  
Glucose → Glycogen  
Glucose → Glucose

cells of liver secrete a hormone that is called: [2012]

B) Glucagon  
D) Gastrin

insulin is a hormone produced by:

[UHS-MODEL PAPER 2011]

B) Parathyroid  
D) Pancreas

Which of the following is the function of glucagon hormone?

[2011]

B) Glucose, Glycogen  
D) Glucose, Protein

### KEY: CHAPTER: 13 COMMUNICATING

11. B	21. D	31. B	41. B
12. C	22. B	32. B	42. D
13. C	23. A	33. A	43. C
14. C	24. C	34. B	44. C
15. D	25. C	35. D	45. B
16. C	26. C	36. A	46. A
17. A	27. C	37. A	47. D
18. D	28. B	38. D	48. D
19. A	29. B	39. D	49. B
20. D	30. B	40. B	50. A

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ALVINSTARY CANAL

90. Gastrin is the hormone which is produced by the: [2012]  
A) Liver  
B) Adrenal gland  
C) Pyloric region of stomach  
D) Mucosal lining of intestine

91. Ovulation is suppressed by progesterone via: [2017]

A) Only by inhibition of LH  
B) Inhibition of FSH and stimulation of LH  
C) Inhibition of LH and stimulation of FSH  
D) Inhibition of FSH and inhibition of LH

DISORDERS OF ENDOCRINE GLAND

92. Over activity of cortical hormone of adrenal gland causes:

A) Addison's disease [2014, 2015]  
B) Parkinson disease  
C) Cushing's disease  
D) Down's syndrome

93. Addison's disease is caused due to destruction of: [2011]

A) Adrenal cortex  
B) Pituitary adrenal axis  
C) Adrenal medulla  
D) Hypothalamus

LANIS HORMONES: AUXINS,

GIBBERELLINS AND ABSICISIC ACID

94. Which of the following promotes both leaf and fruit growths? [2008]

A) Auxins  
B) Gibberellins  
C) Abscissic acid  
D) Ethane

61. D	71. B	81. D	91. A
62. D	72. D	82. A	92. C
63. A	73. A	83. B	93. A
64. B	74. D	84. A	94. B
65. B	75. B	85. C	
66. B	76. D	86. D	
67. D	77. B	87. A	
68. D	78. B	88. D	
69. A	79. B	89. A	
70. D	80. D	90. C	

51. B	61. D
52. A	62. D
53. C	63. A
54. D	64. B
55. B	65. B
56. A	66. B
57. D	67. D
58. D	68. D
59. B	69. A
60. A	70. D

[2016]

thrine



## CHAPTER 14: REPRODUCTION

1. Process ensuring the survival of species over long periods of time, even though individual members of the species die:

[2018]  
A) Respiration B) Adaptability  
C) Mitosis D) Reproduction

### MALE REPRODUCTIVE SYSTEM & SPERMATOGENESIS

2. During spermatogenesis, the \_\_\_\_\_ which are haploid cells eventually mature into spermatozoa/mature sperms:

[2019]  
A) Secondary spermatocytes  
B) primary spermatocytes  
C) spermatogonia  
D) Spermatids

3. Which one of the following directly develops into sperms?

[2017]  
A) Primary spermatocytes B) Spermatids  
C) Secondary spermatocytes  
D) Spermatogonia

4. All of the following are the parts of male reproductive system except

[2017 Retake]  
A) Epididymis B) Semiferous tubules  
C) Cervix D) Bulbourethral gland

5. In human testis, which structure is responsible for carrying sperm from inside the testis?

[2015]  
A) Semiferous tubules B) Urinogenital duct  
C) Seminal vesicle D) Vasa efferentia

6. Testosterone is produced by which one of the following?

[2014]  
A) Sertoli cells B) Germinal epithelium  
C) Interstitial D) Spermatogonia

7. Spermatogonia differentiate directly into:

[2013]  
A) Secondary spermatocytes B) Spermatozoa  
C) Primary spermatocytes D) Spermatids

8. What is the location of interstitial cells in testis?

[2013]  
A) Inside the seminiferous tubules  
B) Among germinal epithelial cells  
C) Between the seminiferous tubules

- D) Around the testis

9. A type of cells in human testes which produce testosterone are called:

[2013]  
A) Sertoli cells B) Spermatozoa  
C) Germ cells D) Interstitial cells

10. Which one of the followings differentiates directly into mature sperm?

[2012]  
A) Primary spermatocyte  
B) Secondary spermatocyte  
C) Spermatogonia  
D) Spermatid

11. Which one of the following hormones is essential for the successful production of sperms:

[CHS-MODEL PAPER 2011]  
A) LH (Luteinizing Hormone).  
B) Gonadotropin hormone  
C) Testosterone  
D) Follicle stimulating hormone (FSH).

12. A type of cells in human testes which produce testosterone is called:

[2011]  
A) Interstitial cells B) Germ  
C) Sertoli cells D) Spermatocytes

13. The First cells produced by the repeated cell division of germinal epithelium of testis are

[2010]  
A) Interstitial cells B) Spermatogonia  
C) Secondary spermatocytes D) Spermatids

### FEMALE REPRODUCTIVE SYSTEM & OOGENESIS

14. Inside ovary, primary oocyte through first meiotic division forming two helix cells, secondary oocyte and:

[2019]  
A) Polar body B) Oogonium  
C) Follicle cell D) Ovum

15. In human female egg is fertilized in:

[2018]  
A) Vagina B) Uterus  
C) Oviduct D) Ovary

16. Which of the following hormone acts on the uterine wall for thickening?

[2018]  
A) Zona pellucida B) Progesterone

which produces  
Spermatocytes (2n)  
Interstitial cells  
differentiates directly

ormones is essential  
of sperms;  
DEL PAPER 2011

(FSH)  
tes which produce

term  
dermatocytes  
the repeated cell  
of testis are

ernatologia  
ernatids  
SYSTEM &

**rough first meiosis**  
**secondary oocyte**

၂၀၁၈

Effects on the water

1915

Where fertilization

is structure in female reproductive system

B) Uterus  
D) Oviduct

Menses occurs in human females during:

12017 Retakej

H) Gametogenesis  
D) Spermiogenesis

Which part of female reproductive system takes place?

Q. The oocyte released during ovulation is in:

[2015]

A) Proximal part of oviduct B) Uterus  
C) Placenta D) Vagina

Q. The oocyte released during ovulation is in:

[2014]

A) Anaphase I B) Prophase I  
C) Metaphase I D) Metaphase II

Q. Yellow glandular structure formed after the release of egg from follicle is called:

A) Corpus callosum  
 B) Graafian follicle  
 C) Corpus luteum  
 D) Follicle atresia

**A) Metaphase**  
**B) Prophase**  
**C) Anaphase**  
**D) Telophase**

Q. The fertilization of ovum takes place in the proximal part of the:

A) Cervix  
B) Fallopian tube  
C) External genitalia  
D) Vulva

[2012]

**[UHS-MODEL PAPER 2011]**

A) Uterus                      B) Oviduct  
C) Placenta                 D) Urethra

At which month of pregnancy the human embryo is referred to as the fetus:

**[UHS-MODEL PAPER 2011]**

A) 1<sup>st</sup> month                  B) 4<sup>th</sup> month  
C) 3<sup>rd</sup> month                D) 2<sup>d</sup> month

Oogenesis are produced in germ cells of:

Both uterus and cervix  
uterus

B) Cervix  
D) Ovary

**MENSTRUAL CYCLE**

27. Which of the following hormone stimulates the ovulation from the follicle into oviduct?

A) Intestining hormone  
B) Follicle stimulating hormone  
C) Progesterone  
D) Testosterone

120193

28. Which hormonal endometrium and make it receptive for implantation of embryo?

A) Luteinizing Hormone and Follicle Stimulating Hormone [2019]  
B) Testosterone and Follicle Stimulating Hormone  
C) Luteinizing Hormone and Follicle Stimulating Hormone  
D) Testosterone and Follicle Stimulating Hormone

29. Which hormone causes the contraction walls of uterus during the process of birth?

30. Which hormone is secreted by the posterior pituitary gland?

**FSH from pituitary gland:**

31. FSH stimulates the production of estrogen hormone which has two targets and

A1 Uterus, posterior pituitary. [2017]

B) Ovaries, uterus  
C) Uterus, anterior pituitary  
D) Ovaries, hypothalamus

32. Which of the following hormone suppresses ovulation?

12017 Retake!

What is the most likely cause of the following hormone causes ovulation?

A) Progesterone  
B) Insulin  
C) FSH  
D) Progesterone

33. Which of the following is not a normal distribution?

34. Events of menstrual cycle are regulated by the:

A) L.H  
B) Progesterone  
C) Estrogen  
D) F.S.H

[2016]

A) Ethylene  
B) Gibberellins  
C) Auxins  
D) Conidiotropins

35. Decrease of FSH and increase of LH in pituitary gland to secrete:

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- A) Somatotropin  
C) Testosterone
36. In females, FSH stimulates the ovary to produce: [2015]  
A) Progesterone  
C) Oestrogen
37. In which phase of human female menstrual cycle, endometrium prepares for the implantation of embryo? [2015]  
A) Proliferative phase  
C) Secretory phase
38. On puberty, development of primary follicles is stimulated by: [2014]  
A) ICSH  
C) LH
39. The hormone produced from corpus luteum is: [2013]  
A) Prolactin  
B) Follicle stimulating hormone  
C) Progesterone  
D) Luteinizing hormone
40. Discharge of ovum or secondary oocyte from ovary or from Graafian follicle is called: [2012]  
A) Cessation of oogenesis  
C) Follicular atresia  
D) Ovulation
41. Pregnancy is maintained by the: [UHS MODEL PAPER 2011]  
A) LTH (Luteotrophic hormone)  
B) Progesterone  
C) Corticosteroids  
D) LH and FSH
42. Breakdown of endometrium during menstruation is due to: [2011]  
A) Increase in level of LH  
B) Decrease in level of progesterone  
C) Increase in level of progesterone  
D) Increase in level of estrogen
43. Luteinizing hormone triggers: [2011]  
A) Cessation of oogenesis  
B) Breakdown of oocyte  
C) Ovulation  
D) Development of zygote
44. Which of the following sequence is correct? [2010]  
A) LH → FSH → Estrogen → Progesterone

- B) FSH → LH → Progesterone → Estrogen  
C) FSH → Estrogen → Progesterone → LH  
D) FSH → Estrogen → LH → Progesterone
45. Which hormonal pair shares a common hypothalamic releasing factor?  
A) GnRH and LH  
C) FSH and GnRH  
D) FSH and LH

46. Which of the following will happen if fertilization does not occur?  
A) Menopause starts  
B) Corpus luteum degenerates  
C) FSH secretion is increased  
D) Progesterone secretion is increased

## SEXUALLY TRANSMITTED DISEASES

47. Syphilis is a sexually transmitted disease and also damage:  
A) Hair  
B) Heart  
C) Peripheral nervous system  
D) Birth canal

48. Transmission of Neisseria gonorrhoea is described by which one of the following?  
A) Oro-faecal route  
B) Unsafe sex  
C) Vector borne  
D) Droplet infection

49. Syphilis is caused by:  
A) Spirochaete  
B) Nostoc  
C) Waterblooms  
D) Cyanobacteria

50. AIDS is caused by:  
A) Bacteria  
B) Virus  
C) Fungi  
D) Alga

51. Causative agent of a sexually transmitted disease that affects mucous membrane of the urogenital tract is:  
A) Staphylococcus aureus  
B) Treponema pallidum  
C) Neisseria gonorrhoea  
D) Escherichia coli

52. Treponema pallidum cause a disease (sexually transmitted) called:  
[UHS MODEL PAPER 2011, 2013]  
A) Genital Herpes  
B) AIDS  
C) Gonorrhoea  
D) Syphilis

53. Syphilis is a sexually transmitted disease which is caused by:  
[2011, 2013]  
A) Neisseria gonorrhoea  
B) Pseudomonas pyogenes

7. D  
8. D  
9. B  
10. B  
11. C  
12. C

Terminology  
Recessive Phenotype  
Heterozygous  
I. Homozygous

- A) Having  
B) Having  
C) Alleles  
D) Two different alleles  
2. In genetics, gene on the

- A) Frequency  
C) Position  
3. \_\_\_\_\_ is a chromosome

- A) Genotype  
C) Centromere  
4. The region specifically has a particular

- A) Locus  
C) Allele  
5. Locus stands

- A) Position  
B) Region  
C) Position  
D) Close relationship



1) A newborn infant may acquire serious eye infections, if his/her mother has:  
 B) AIDS [2009]  
 2) Genital herpes [2009]

3) Gonorrhea  
 4) Syphilis is caused by:  
 A) *Neisseria gonorrhoeae* [2008, 2015]  
 B) *Flatworm*  
 C) *Treponema pallidum*  
 D) *Herpes simplex*

Key: CHAPTER 14: REPRODUCTION

- 7. C
- 8. C
- 9. D
- 10. D
- 11. C
- 12. A
- 13. B
- 14. A
- 15. C
- 16. B
- 17. D
- 18. B
- 19. A
- 20. D
- 21. C
- 22. A
- 23. A
- 24. B
- 25. A
- 26. D
- 27. A
- 28. D
- 29. D
- 30. C

- 31. C
- 32. A
- 33. A
- 34. B
- 35. B
- 36. C
- 37. C
- 38. B
- 39. C
- 40. D
- 41. B
- 42. B
- 43. C
- 44. D
- 45. D
- 46. B
- 47. B
- 48. B
- 49. A
- 50. B
- 51. C
- 52. D
- 53. C
- 54. C
- 55. C

Chapter 15: GENETICS

Terminologies (Gene, Locus, Dominant, Recessive Phenotype, Genotype, Homozygous, Heterozygous, Polygenic, Inheritance)

Homozygous means:

- A) Having two identical alleles of a gene [2019]
  - B) Having two identical genes
  - C) Alleles in an organism
  - D) Two different alleles of a gene
2. In genetics, the term locus refers to the \_\_\_ of the gene on the chromosome. [2019]

- A) Frequency
  - B) Copy
  - C) Position
  - D) Inversion
3. \_\_\_ is the exact position of gene on the chromosome: [2018]

- A) Genotype
  - B) Locus
  - C) Centromere
  - D) Trait
4. The region of the chromosome or, more specifically, a length of the DNA molecule, which has a particular role called: [2018]

- A. Locus
  - B) Gene
  - C. Allele
  - D) Inversion
- Locus stands for: [2017]

- A) Position of gene on homologous chromosomes
- B) Regions of chromosomes
- C) Position of an allele within a DNA molecule
- D) Close regions of same chromosomes

- 6. The total number of genes in a population is called: [2016]

- A) Gene pool
- B) Allele pool
- C) Genome
- D) Genomic library

- 7. Human skin color is a good example of: [2015]

- A) Sex linked inheritance
- B) Polygenic inheritance
- C) X-linked inheritance
- D) Y-linked inheritance

- 8. Position of an allele within a DNA molecule is: [2014]

- A) Locus
- B) Origin
- C) Amplicon
- D) Initial

- 9. The karyotype of an individual is \_\_\_ of chromosomes. [2010]

- A) Number
- B) Types
- C) Number, types and chemical composition
- D) Number and types

- 10. Position of a gene on the chromosome is called its: [2008]

- A) Phenotype
- B) Locus
- C) Function
- D) Genotype

- 11. The colour phenotype of grain is the sum of alleles: [2008]

- A) Six
- B) Five
- C) Four
- D) Five or three

MENDELIAN INHERITANCE

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12. In which situation, genes are not assorted independently meiosis in a chromosome?

- A) When genes are not linked and their loci are far apart [2019]  
 B) When there are too many genes on a chromosome  
 C) When some genes have mutated on the chromosome  
 D) When genes are linked and their loci are close to each other

13. As a result of cross fertilization of true breeding pea plant having purple colored flowers with that of white colored flowers, the offspring's will have flower with:

- A)  $\frac{1}{4}$  purple and  $\frac{3}{4}$  white [2017]  
 B)  $\frac{1}{4}$  white and  $\frac{3}{4}$  purple  
 C) All white  
 D) All purple

14. Self-fertilization of  $F_1$  dihybrids, following independent assortment of alleles will result in:

- A) 3/16 Tall, round; 3/16 Dwarf wrinkled [2017]  
 B) 9/16 Tall, wrinkled; 1/16 Dwarf, round  
 C) 9/16 Tall, round; 1/16 Dwarf, round  
 D) 3/16 Tall, wrinkled; 3/16 Dwarf, round

#### DOMINANCE RELATIONS

15. Blood group AB is an example of:

- A) Complete dominance [2019]  
 B) Co dominance  
 C) Incomplete dominance  
 D) Recessive alleles

16. When two or more Allele do not show complete dominance or both the alleles are expressing independently in heterozygous condition. Such a condition is called:

- A) Complete dominance [2018]  
 B) Over dominance  
 C) Co dominance  
 D) Incomplete dominance

17. Pure breeding lines of Pea were taken regarding seed shape Round and Wrinkled were crossed with no intermediate between parents. All offspring's were found to be round. These results show:

- A) Co-dominance [2017]  
 B) Dominant\_recessive relationship of alleles  
 C) Incomplete dominance

18. The condition in which heterozygote has a phenotype intermediate between contrasting homozygous parents is called:

[2017]

A) Dominance

B) Co dominance

C) Over dominance

D) incomplete dominance

19. Different alleles of a gene that are both expressed in a heterozygous condition are called [2017]

A) Complete dominance

B) Incomplete dominance

C) Co dominance

D) Over dominance

20. When phenotype of a heterozygote is in between the phenotypes of both the homozygote parents, it is called:

- A) Incomplete dominance [2009]  
 B) Pleiotropy  
 C) Epistasis  
 D) Codominance

#### MULTIPLE ALLELE (ABO & Rh BLOOD GROUP SYSTEM)

21. Which one of the following is multiple allelic character?

- A) Length of stem in pea plant [2018]  
 B) Shape of seed in pea plant  
 C) Blood group of Human being  
 D) Colour of flower in pea plant

22. A character determined by three alleles is:

- A) Human skin color [2016]  
 B) Human blood group  
 C) Human eye color

23. Blood group antigen contains:

- A) Glycoprotein [2015]  
 B) Glycolipid  
 C) Phospholipid  
 D) Sphingomyelin

24. ABO blood system is an example of:

- A) Polygenes [2015]  
 B) Multiple genes  
 C) Multiple alleles  
 D) Multiple mutation  
 E) Human Rh factor

25. The gene for ABO-blood group system in humans is represented by symbol:

- A) X [2012]  
 B) I  
 C) Y  
 D) O

26. Which trait in human is an example of multiple alleles?

- A) Eye colour [2011]  
 B) Skin colour  
 C) ABO blood group  
 D) Rh blood group

27. Which one of following is correct about Rh+ blood?

- A) Will produce anti-Rh antibodies if given Rh blood [2009]  
 B) Cannot produce anti-Rh antibodies in any case  
 C) Rh' antigens are present on RBCs  
 D) Rh' antibodies are present in blood



47. Which one of the following is X-linked trait? [2016]

- A) Male pattern baldness  
B) Diabetes mellitus  
C) Haemophilia  
D) D) Erythroblastosis foetalis

48. Which of the following will be hemophilic? [2011]

- A)  $X^h X^h$   
B)  $X^h X^H$   
C)  $XY$   
D)  $X^H Y$

49. Which of the following is an example of X-linked recessive trait in human? [2011]

- A) Hypophosphatemic rickets  
B) Colour blindness  
C) Baldness  
D) Beard growth

50. When a disease is transmitted directly from an affected father to his son, it is called:

- A) X-linked [2010]  
B) Autosomal  
C) Y-linked  
D) X and Y-linked

51. What is true about pattern baldness? [2009]

- A) It is autosomal recessive disease in males  
B) It is autosomal dominant disease in males  
C) It is X-linked disease  
D) It is Y-linked disease

#### SEX DETERMINATION

52. XO-XX is the sex determining pattern in: [2017-Retake]

- A) Grasshopper  
B) Drosophila  
C) Butterfly  
D) Man

53. Number of pairs of autosomes in human is: [2015]

- A) 23  
B) 24  
C) 21  
D) 22

54. In male, the sex determining gene is:

- A) XY [2014]  
B) SRY  
C) SXY  
D) SXX

55. In men sex-determination depends upon the nature of:

- A) Heterogametic male [2012]  
B) Homogametic female  
C) Heterogametic female  
D) Homogametic male

#### Key - CHAPTER: 15: GENETICS

1. A	5. C	9. D	13. D	17. B
2. C	6. A	10. B	14. D	18. D
3. B	7. B	11. A	15. B	19. C
4. B	8. A	12. D	16. C	20. A

21. C	25. B	29. A	33. D
22. B	26. C	30. A	34. D
23. A	27. C	31. B	35. A
24. C	28. D	32. C	36. C

37. B  
38. A  
39. A  
40. B



generation attempt  
who is;  
Homogametic  
Isomorphic

Diegametic  
Both B & C

and insertion

2014

Transposon  
Base substitution  
of;

Polyploidy  
Inversion  
change in sequence

Deletion  
Point mutation  
uple of which type

2010

is known as;  
HIS PAPER 2011  
Pleiotropy  
Polygenic trait  
anine is not degraded

2009

33. D  
34. D  
35. A  
36. C

2014

44. B  
45. B  
46. C

50. C  
51. B  
52. A

53. D  
54. B  
55. A

56. A  
57. C  
58. B

59. D  
60. A  
61. D  
62. D  
63. C  
64. A

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## Chapter 16 Biotechnology

### Recombinant and technology:

plasmid pBR322 has antibiotic resistance

for:

2019

- tetracycline and doxycycline
- streptomycin
- doxycycline and Ampicillin
- ampicillin and tetracycline

parvines used by Bacteria to cut the DNA of the

attacking virus for its protection is

2018

- restriction endonuclease
- restriction Ligase
- DNA polymerase
- restriction exonuclease

DNA made by joining pieces from two or more

different resources

2018

- Mutated DNA
- Restriction endonuclease

Probes

Restriction enzyme EcoRI cuts DNA to produce:

2017

- Blunt ends
- Sticky ends
- Non-palindromic ends
- Split ends

Restriction endonucleases are produced by:

2017

- Fungi
- Bacteria
- Algae
- Viruses

formation of new strand of DNA from template

strand is the function of:

2017-Retake

- DNA polymerase
- DNA ligase

Commonly used restriction enzyme is:

2017-Retake

- EcoRI
- pBR 322
- pSC 101
- BAL 1

Gene can be from mRNA using

2017-Retake

- Reverse transcriptase
- DNA ligase
- DNA polymerase
- Helicase

restriction endonuclease cleaves the

duplex DNA

2016

- Nitrogenous base
- Phosphodiester bond
- Pentose sugar
- Hydrogen bond

The enzymes which is responsible for the formation

of bond between double stranded

DNA fragments

are:

- Endonuclease
- Ligase

2016

acts as an ideal expression system in

recombinant DNA technology

2016

- Retrovirus
- Algae
- Protavirus
- Bacteria

The DNA formed by the reverse transcription is

called:

- rDNA
- cDNA
- B DNA
- D DNA

2015

Bacteria cells take up recombinant plasmids when

they are treated with

2015

- CaCl<sub>2</sub>
- KCl
- NaCl
- NaOH

pBR322 have antibiotic resistant genes for:

2014

- Ampicillin and aspirin
- Streptomycin and metronidazole
- Ampicillin and tetracycline
- Penicillin and metronidazole

The enzymes which act as molecular scissors in

recombinant DNA technology:

2014

- Exonucleases
- Reverse transcriptase
- Polymerases

When two pieces of DNA are joined together, the

result is which one of the following?

2014

- Complementary DNA
- Mutated DNA
- Recombinant DNA
- Joined DNA

The DNA molecule formed from mRNA by reverse

transcriptase is called:

2013

- Chimeric DNA
- Complementary DNA
- Plasmid DNA

The phage commonly used as a vector in genetic

engineering is

2013

- Gamma phage
- Lambda phage
- T<sub>4</sub> phage

2013

Restriction endonucleases are naturally occurring

enzymes of:

- Viruses
- Fungi
- Plants
- Bacteria

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20. In recombinant DNA technology — are tools for manipulating DNA

- [2012]  
A) Viruses  
B) Enzymes  
C) Plasmids  
D) Probes

21. In the recombinant DNA technology plasmids are used as:

- [2012]  
A) Genetic material  
B) Vectors  
C) Probes  
D) Plasmids

22. *Lucymer* restriction endonucleases were isolated from

- [UHS-MODEL PAPER 2011]  
A) Viruses  
B) Bacteria  
C) Fungi  
D) Protozoan

23. Which enzyme is used to join the desired gene into the plasmid DNA during genetic engineering:

- [UHS-MODEL PAPER 2011]  
A) DNA Helicase  
B) DNA Ligase  
C) DNA Polymerase  
D) Taq Polymerase

24. The common vectors used in recombinant DNA technology are:

- [2011]  
A) Probes  
B) Palindromes  
C) Plasmids  
D) Prions

25. The enzyme used to isolate gene from DNA is:

- [2011]  
A) Helicase  
B) Reverse transcriptase  
C) Restriction enzymes  
D) DNA polymerase

26. Gene can be synthesized in laboratory from messenger RNA by using:

- [2010]  
A) Restriction enzymes  
B) cDNA (complementary DNA)  
C) Vector  
D) Reverse Transcriptase

27. Antibiotic resistance gene for tetracycline and ampicillin are present in the plasmid:

- [2010]  
A) pSC 101  
B) pCR 101  
C) pBR 322  
D) pBR 233

#### POLYMERASE CHAIN REACTION (PCR)

28. DNA polymerase enzyme for PCR is isolated from bacteria *Thermus aquaticus* because

- [2019]  
A) It can withstand high denaturation temperature  
B) It can withstand low denaturation temperature  
C) It can work at high speed  
D) It can be used again and again

29. By PCR we mean

- [2018]  
A) Polymerase chain reaction  
B) Polymerase chain reaction  
C) Polymerase copy reaction  
D) Polymerase chrome reaction

30. Chemical nature of primer used in PCR process is

- [2018]  
A) Protein  
B) Carbohydrate  
C) RNA  
D) DNA

31. — is the first heat stable component used in PCR

- [2015]  
A) Taq isomerase  
B) Taq heliase  
C) Taq polymerase  
D) Taq SSbp

32. — enzyme is very stable and active even at very high temperature

- [2016]  
A) RNA polymerase  
B) DNA polymerase  
C) Helicase  
D) Taq polymerase

33. Which one of the following is a correct sequence of PCR?

- [2014]  
A) Heating → Cooling → Add Primer → Copying of strand  
B) Heating → Add primer → Cooling → Copying of strand  
C) Add primer → Heating → Cooling → Copying of strand  
D) Cooling → Add primer → Heating → Copying of strand

34. The agent which separates the two strands of DNA in PCR is?

- [2013]  
A) DNA ligase  
B) Heat  
C) Primer  
D) Helicase

35. In which process multiple copies of the desired genes are produced

- [2012]  
A) Polymerase chain reaction  
B) Gene sequencing  
C) Analyzing DNA  
D) DNA finger printing

36. During polymerase chain reaction, how DNA double helix is separated

- [UHS-MODEL PAPER 2011]  
A) By heat treatment  
B) By use of enzyme DNA polymerase  
C) By use of enzyme DNA Helicase  
D) By use of enzyme DNA Ligase

37. Which one of the following enzymes is temperature insensitive?

- [2011]  
A) DNA polymerase  
B) Taq polymerase  
C) DNA polymerase-III  
D) RNA polymerase

38. Temperature insensitive (thermostable) enzyme used in PCR is:

- [2009]  
A) DNA polymerase I  
B) DNA polymerase III  
C) DNA ligase  
D) Taq polymerase

#### DNA ANALYSIS (FINGER PRINTING)

##### GENE SPOFFING

39. DNA fragments of different lengths can be separated by a process of

- A) Western blotting  
C) Autoradiography
40. Collection of bacterial or bacteriophage clones is called [2017]  
B) Northern blotting  
D) Gel electrophoresis
- A) Gene pool  
C) Genomic library
41. Which one of the following is made up of radioactively labeled nucleotides [2017-Retake]  
D) Bench mark
- A) Plasmid DNA  
C) Recombinant DNA
42. In DNA finger printing process, the use of produces distinctive pattern on autoradiography or X-ray film [2015]  
D) Gene probe
- A) Restriction enzyme  
B) Microsatellites  
C) Macrosatellites  
D) Probes for genetic markers
- TRANSGENIC ORGANISMS**
43. Transgenic mice have been used to produce [2012]  
A) Protein rich milk  
B) A growth hormone  
C) Protein rich meat  
D) Extra hair
44. A technique in transgenic animals in which desired gene is inserted into the eggs of animal is called [2015]  
A) Embryonic stem cell mediated transfer  
B) Microinjection  
C) Retro virus mediated gene transfer  
D) Virus vector
45. The use of living organisms in industry for the production of useful products is known as [2014]  
A) Parasitology  
B) Biochemistry  
C) Biotechnology  
D) Molecular Biology
46. Plants having foreign DNA incorporated into their cells are called [2014]  
A) Clone plants  
B) Transgenic plants  
C) Parthenocarpic plants  
D) Mutant plants
47. The plants having foreign DNA incorporated into their cells are called [2013]  
A) Clone plants  
B) Biotech plants  
C) Transgenic plant  
D) Tissue cultured plants
48. Which of the following is an example of benefits of transgenic organisms produced through genetic engineering [2015-MODEL PAPER 2011]  
A) Production of antibiotics  
B) Production of insulin  
C) Production of anti-rabies vaccine  
D) Production of anti-malarial drugs

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49. Which enzyme is administered to the patients of severe combined immunodeficiency disease [2019]  
A) Pancreatic lipase  
B) Adenine deaminase (ADA)  
C) Ribonuclease  
D) Tyrosinase
50. Deficiency of enzyme causes combine immunodeficiency syndrome [2018]  
A) Adenine deaminase  
B) Adenine deaminase  
C) Adenine deaminase  
D) Adenine deaminase
51. Patients of Cystic Fibrosis (CF) produce thick mucus due to faulty [2017]  
A) Trans-membrane carrier B)  $Cl^{-}$  ions  
C)  $Na^{+}$  ions  
D) Mucus membrane
52. In cystic fibrosis, liposomes-microscopic vesicles are used which are coated with [2015]  
A) Healthy gene  
B) Chromosome  
C) Protein  
D) Carbohydrate
53. Cystic fibrosis affects which one of the following cells of the body? [2014]  
A) Epithelial cells  
B) Endothelial cells  
C) Plasma cells  
D) Blood cells
54. Cystic fibrosis patients lack a gene that codes for trans-membrane carrier of [2013]  
A)  $Na^{+}$  ion  
B)  $Ca^{+2}$  ions  
C)  $Cl^{-}$  ions  
D)  $K^{+}$  ions
55. The enzyme adenosine deaminase is missing in persons suffering from [2012]  
A) Cystic fibrosis  
B) Hypercholesterolemia  
C) Severe combined immunodeficiency syndrome  
D) Parkinson's disease
56. In cystic fibrosis transportation of which ion is faulty, resulting into the production of disease [2015-MODEL PAPER 2011]  
A) Chloride  
B) Fluoride  
C) Calcium  
D) Magnesium
57. Liposome are used in gene therapy against [2011]  
A) Hypercholesterolemia  
B) Severe combined immunodeficiency syndrome  
C) Cystic fibrosis  
D) Coronary artery aneurysm
58. Genetically engineering cells are introduced into bone marrow cells in the treatment of [2011]  
A) Hypercholesterolemia  
B) Severe combined immunodeficiency syndrome  
C) Cystic fibrosis  
D) Coronary artery aneurysm

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- A) Hypercholesterolemia  
 B) Severe combined immunodeficiency syndrome  
 C) Cystic fibrosis  
 D) Coronary artery angioplasty

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59. Commercial methods of producing thousands, even millions of identical seedlings limited amount of space can be achieved through

- [2017-Retake]  
 A) Micropropagation B) Anther culture  
 C) Cell suspension culture D) Tissue culture

60. Antigens to treat Non-Hodgkin's lymphoma are produced by

- [2009]  
 A) Wheat Plant B) Rice Plant  
 C) Tobacco Plant D) Corn Plant

61. The cell suspension culture of \_\_\_\_\_ produces quinine

- [2008]  
 A) Soya bean B) Cinchona ledgeriana

**Key : CHAPTER 16: BIOTECHNOLOGY**

1. D	8. A	15. B	22. B	29. B	36. A	43. B	50. C	57. C	64. B
2. A	9. C	16. C	23. B	30. D	37. B	44. B	51. A	58. B	
3. D	10. C	17. D	24. C	31. C	38. D	45. C	52. A	59. A	
4. C	11. D	18. D	25. C	32. D	39. D	46. B	53. A	60. C	
5. C	12. C	19. D	26. D	33. A	40. C	47. C	54. C	61. B	
6. A	13. A	20. C	27. C	34. B	41. D	48. B	55. C	62. B	
7. A	14. C	21. C	28. A	35. A	42. D	49. B	56. A	63. D	

**UNIT 17: EVOLUTION****THEORIES OF EVOLUTION**

1. According to the theory of natural selection, organisms produce:

[2019]

- A) More offspring than supported  
 B) Less offspring than supported  
 C) Offspring according to the resources available  
 D) Offspring to create resources
2. Acquired characteristics are inherited, that is the concept given by:

[2017-Retake]

- A) Lamarck B) Malthus  
 C) Cuvier D) Lyell

3. Charles Darwin gave the:

[UHS-Model Paper 2011]

- A) Theory of special creation  
 B) Theory of Natural selection.  
 C) Inheritance of acquired characters.

**CLONING AND THEIR APPLICATIONS**

62. The production of genetically identical copies of organisms by asexual reproduction is

[2013]

- A) Genetic engineering  
 B) Cloning  
 C) Integrated disease management  
 D) Hydroponic culture technique
63. Newly produced cells/individuals which are identical to each other are known as

[2011]

- A) Genetically modified B) Transgenic animals  
 C) Transgenic bacteria D) Clones

[2009, 2010]

64. Cloning is a form of  
 A) Parthenogenesis/Vegetative propagation  
 B) Apomixis /Genetic Recombination  
 C) Sexual Reproduction  
 D) Asexual Reproduction

4. The survival of an organism during the struggle for existence is not random, but depends on:

[2009]

- A) Its genetic constitution  
 B) Its ability to acquire characters  
 C) Its ability to over-produce  
 D) Its ability to over-eat

**EVIDENCES OF EVOLUTION**

5. Divergent evolution produces:

[2016]

- A) Homologous organs B) Vestigial organs  
 C) Vital organs D) Analogous organs

6. Organs specialized to perform different functions but structurally alike are:

[2016]

- A) Homologous organs B) Analogous organs  
 C) Analogous organs D) Analogous organs



7. The actual or preserved remains of the organisms that lived in the ancient past are

- A) Fossils [2018]  
 B) Impression  
 C) Ancient prints  
 D) Ancient cast  
 8. Process by which unrelated species evolve to functionally resemble each other is called:

- A) Convergent evolution [2017]  
 B) Divergent evolution  
 C) Co-evolution  
 D) Parallel evolution  
 9. Which one of the followings shows evidence of evolution from Molecular Biology?

- A) Development of bronchial arches in vertebrate embryo [2017]  
 B) Distribution of species  
 C) Comparison of genes and proteins in different species  
 D) Study of vestigial organs

10. Functionally different and structurally alike organs are called:

- A) Vestigial organs [2017-Retake]  
 B) Analogous organs  
 C) Extinct organs  
 D) Homologous organs

11. Which one of the following is considered as strong evidence of evolution?

- A) Embryology record [2016]  
 B) Molecular record  
 C) Biochemical record  
 D) Fossil record

12. Structures found in different species which are believed to have a common evolutionary origin are:

- A) Homologues [2016]  
 B) Analogous  
 C) Vestigial  
 D) Fossilized

13. From evolutionary point of view, which respiratory protein is common in many organisms?

- A) Cytochrome a [2015]  
 B) Cytochrome b  
 C) Cytochrome c  
 D) Cytochrome d

14. The structures which are reduced during the course of evolution and have no apparent functions are called:

- A) Regenerated organs [2013]  
 B) Saltatory organs  
 C) Vestigial organs  
 D) Useless organs

15. The comparative embryology of all vertebrates shows development of:

- A) Gills pouches [2012]  
 B) Gill pouches  
 C) Fins  
 D) Faint

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16. The branch of biology that provide evidence through fossil record is called:

- A) Vestigial structures [11 His Model Paper 2011]  
 B) Comparative anatomy  
 C) Biogeography  
 D) Palaeontology

17. Which of the following proteins is common in man and aerobic bacteria?

- A) Haemoglobin [2010]  
 B) Myoglobin  
 C) Cytochrome c  
 D) Pepsin

18. Evolutionary relationships amongst species are reflected in their:

- A) DNA and proteins [2009]  
 B) RNAs and proteins  
 C) DNA and genes  
 D) DNA and RNAs

19. \_\_\_\_\_ organs are functionally different but structurally alike:

- A) Analogous [2008]  
 B) Unillogous  
 C) Homologous  
 D) Hypologous

#### HARDY-WEINBERG THEOREM

20. Change in frequency of alleles that occurs by chance is called as:

- A) Natural selection [2019]  
 B) Migration  
 C) Mutation  
 D) Genetic drift

21. Large population size, random mating, no mutation and no emigration or immigration are postulates of:

- A) Hardy-Weinberg equation [2017-Retake]  
 B) Mendel's law of independent assortment  
 C) Mendel's law of segregation  
 D) Theory presented by Schleiden and Schwann

22. Change in frequency of alleles at a locus that occurs by chance is called:

- A) Mutation [2017-Retake]  
 B) Migration  
 C) Non-random mating  
 D) Genetic drift

23. Which of the following factor causes change in gene frequency:

- A) Meiosis [2017-Retake]  
 B) Sexual recombination  
 C) Mutation  
 D) Random mating

24. One of the factors given below does not affect gene frequency:

- A) Mutation [11HS-Model Paper 2011]  
 B) Migration  
 C) Natural selection  
 D) Genetic drift

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C) Genetic drift.

25. If all the members of a population are homozygous for the same allele, that allele is said to be:

- D) Food
- A) Random in population's pool  
B) Fixed in population's pool  
C) Random in a species  
D) Fixed in the gene pool

[2009]

Key of CHAPTER 17: EVOLUTION

- |      |      |      |       |       |       |       |       |       |
|------|------|------|-------|-------|-------|-------|-------|-------|
| 1. A | 4. A | 7. A | 10. D | 13. C | 16. D | 19. C | 22. D | 25. D |
| 2. A | 5. A | 8. A | 11. B | 14. C | 17. C | 20. D | 23. C |       |
| 3. B | 6. A | 9. C | 12. A | 15. B | 18. A | 21. A | 24. D |       |

# UNIT 1: Physics Chapter 1: Measurement

## PHYSICAL QUANTITIES

1. The different magnitudes of same physical quantities are measured by comparing them to

- A) available scale
- B) each other
- C) D) other physical quantities
- Which of the following is a supplementary physical quantity?

- A) Radian
- B) Steradian
- C) Both A and B
- D) None

- 3. The quantities which can be measure accurately are called
- A) Base Quantities
- B) Derived Quantities
- C) Physical Quantities
- D) Supplementary Quantities

- 4. The wavelength of a wave depends on the speed 'v' of the wave and its frequency 'f'. Decide which of the following is correct?
- A)  $f = \frac{v}{\lambda}$
- B)  $f = v\lambda$
- C)  $f = \lambda/v$
- D)  $f = v\lambda^{-2}$

## INTERNATIONAL SYSTEM OF UNITS

5. Force is derived quantity; it's derived unit can be expressed in terms of the base unit as

- A)  $\text{kgms}^{-2}$
- B)  $\text{kgcms}^{-2}$
- C)  $\text{kmgs}^2$
- D)  $\text{kmgs}^3$
- 6. The unit of magnetic flux density is the tesla, 'T', it can also be expressed as
- A)  $1 \text{ N}^{-1} \text{ A}^{-1} \text{ m}$
- B)  $1 \text{ N}^{-1} \text{ A}^{-1} \text{ m}^{-1}$
- C)  $1 \text{ N A}^{-1} \text{ m}$
- D)  $1 \text{ N A}^{-1} \text{ m}^{-1}$
- 7. The unit of temperature in base unit is

- A) Celsius
- B) Degree
- C) Kelvin
- D) Fahrenheit
- 8. The formula for electric field strength is  $E = F/Q$ , where E is electric field strength, F is force and Q is charge. Which of the following options gives the

correct base unit for electric field strength?

- A)  $\text{kgms}^{-1} \text{ A}^{-1}$
- B)  $\text{kg s}^{-1} \text{ A}^{-2}$
- C)  $\text{kg s}^{-1} \text{ A}^{-2}$
- D)  $\text{kg m}^{-2} \text{ s}^{-1} \text{ A}^{-1}$
- 9. The unit for electric charge is Coulomb and one coulomb in terms of base unit is equivalent to
- A)  $\text{Vm}$
- B)  $\text{Js}^{-1}$
- C)  $\text{As}$
- D) C
- 10. Name the quantity which can be measure by using base unit 'kg m<sup>2</sup> s<sup>-2</sup> A<sup>-1</sup>'

- A) Weight
- B) Pressure
- C) Power
- D) Work
- 11. SI unit of electric flux is

- A)  $\text{NmC}^{-1}$
- B)  $\text{Nm}^{-2} \text{ C}^{-2}$
- C)  $\text{Nm}^2 \text{ C}^{-1}$
- D)  $\text{Nm}^2 \text{ C}^{-2}$
- 12. SI unit of charge is

- A) Ampere
- B) volt
- C) Coulomb
- D) calone
- 13. Light year is the measure of

- A) Distance
- B) Time
- C) Intensity of light
- D) Velocity
- 14. The units of  $E=mc^2$  are

- A)  $\text{kg m s}^{-2}$
- B)  $\text{N m s}^{-2}$
- C)  $\text{kg m}^2 \text{ s}^2$
- D) Both B and C

## PREFIXES

15. Which set of the prefixes give values in increasing order?

- A) Pico, Mega, Kilo, Tera
- B) Pico, Micro, Mega, Giga
- C) Tera, Pico, Micro, Kilo
- D) Giga, Kilo, Milli Nano
- 16. Which one is the highest power multiple

- A) Giga
- B) Tera
- C) Mega
- D) Peta

## ERROR AND UNCERTAINTY

17. An observer notes reading of a scale from different angles (parallax) while measuring the length of

Wire, what kind of error can occur?

- A) Systematic error  
C) Precised Error

[2017]

- B) Zero Error  
D) Random Error

### PRECISION AND ACCURACY

18. Percentage uncertainty in length and width of a rectangle is 2% and 3%. The total uncertainty in area of the rectangle is?

- A) 1.5%  
C) 6%

- B) 5%  
D) 1%

[2019]

19. The diameter of a wire is measured by using a micrometer screw gauge with least count of 0.01 mm, and then which of the following reading will be correct?

- A) 0.067 cm  
C) 0.67 cm

- B) 0.0067 mm  
D) 6.70 cm

[2013]

### KEY AND SOLUTION

- Answer: B-Solution:** The different magnitudes of same physical quantities are measured by comparing them to standard size (Text Book)
- Answer: D-Solution:** Radian and steradian are the supplementary units. Radian and steradian are not physical quantities. Plane and solid angle are the supplementary quantities of radian and steradian respectively
- Answer: C-Solution:** The quantities which can be measured accurately are called physical quantities
- Answer: A-Solution:**  $V = \lambda f \Rightarrow \frac{m}{s} = \frac{m}{s}$
- Answer: A-Solution:**  $F = ma = kg \frac{m}{s^2} = kgms^{-2}$
- Answer: B-Solution:** As Flux density = Magnetic Flux / area so  $B = \frac{WB}{m^2}$  and  $WB = 1 NA^{-1}m$  so  $1T = NA^{-1}m^{-1}$

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- Answer: C-Solution:** Temperature  $^{-1}$  is unit is kelvin
- Answer: A-Solution:**  $E = \frac{p}{q} \Rightarrow \frac{kgm}{s^2C} = \frac{kgm}{As}$
- Answer: C-Solution:**  $Q = It, IC = As$
- Answer: C-Solution:**  $P = \frac{W}{t} = \frac{I}{s} = \frac{Vm}{s} = \frac{Vm^2}{s^2}$
- Answer: C-Solution:** Electric Flux  $= E \cdot A \cdot \cos \theta$
- Answer: C-Solution:** According to the definition current I  $Q/t$  and  $Q = 1 \times 1$  so C As
- Answer: A-Solution:** A light year is the distance travel in one year so light year (Distance)  $\times$  light x time
- Answer: C-Solution:**  $E=mc^2$  in this formula has same unit as that of work. Proof  $E=mc^2$  where mass of object and  $c =$  speed of light so  $E = (ms^{-1})^2 = kg m^2 s^{-2}$
- Answer: B-Solution:** Pico =  $10^{-12}$ , Micro =  $10^{-6}$  Mega =  $10^6$ , Giga =  $10^9$
- Answer: B-Solution:** 1 Giga =  $10^9$ , 1 Mega =  $10^6$ , Deca =  $10^2$
- Answer: D-Solution:** An observer notes reading scale from different angle (parallel) while measuring the length of wire that kind of error is called parallax error.
- Answer: B-Solution:** According to the formula Area of rectangle = length x width  
So total uncertainty in  
Area =  $1\% + 1\% = 2\% + 3\% = 5\%$
- Answer: A-Solution:** Least count =  $0.01 \text{ mm} - 0.001 \text{ cm}$  so the value has three digits after decimal is correct

Chapter 2: Motion and Force

DISTANCE AND DISPLACEMENT

- The ratio of displacement along diameter and total distance along circle is

- A)  $\pi:1$   
B)  $2:\pi$   
C)  $\pi:2$   
D)  $1:\pi$

- The value of ratio of displacement to distance is

- A) Always one  
B) Always less than one  
C) More than one  
D) Equal or less than one

- A force  $F$  is applied to a beam at a distance  $d$  from a pivot. The force acts angle  $q$  to a line perpendicular to the beam

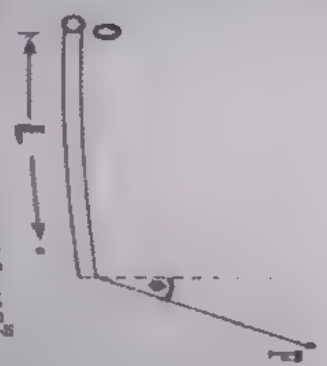
Which combination will cause the largest turning effect about the pivot?

- A) Large Large Large  
B) Large Large Small  
C) Small Small Large  
D) Small Large Small

- If we double the moment arm the value of torque becomes

- A) Half  
B) Three times  
C) Two times  
D) Four times

- A bar of length 'L' pivoted at 'O' is acted by a force 'F' at an angle ' $\theta$ ' with vertical line as shown in figure



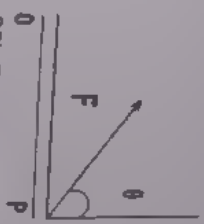
- What is the moment of force?
- A)  $L \sin \theta$   
B)  $L \cos \theta$

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- Ratio of moment of inertia of two objects 'A' and 'B' is 2:3. Which of the following is the ratio of torques of 'A' and 'B' respectively if both being rotated with constant angular acceleration?

- A) 3:4  
B) 2:3  
C) 3:2  
D) 4:3

- A force 'F' is acting at point 'P' of a uniform rod capable to rotate about 'O'. What is the torque about?



- A)  $(OP) (F \sin \theta)$   
B)  $(OP) (F \cos \theta)$   
C)  $(OP) (F \sin \theta)$   
D)  $(OP) (F \cos \theta)$

- A simple pendulum length 'L' with bob of mass 'm' is slightly displaced from its mean position so that it string makes an angle ' $\theta$ ' with vertical line as shown in the figure. Then bob of pendulum released. What will be the expression of torque with which the bob starts to move towards the mean position?

- A)  $mgL \sin \theta$   
B)  $mgL \cos \theta$   
C) 0  
D)  $mgL \sin \theta$

- What is torque ' $\tau$ ' in a circular motion?

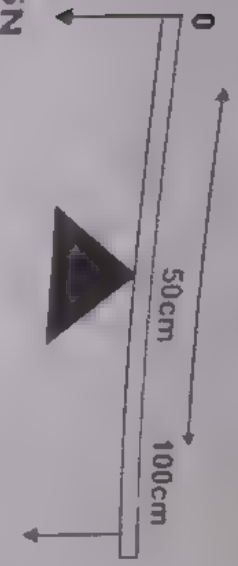
- A)  $T = mr^2 \alpha$   
B)  $T = mr^2 \omega$   
C)  $T = m r^2 \alpha$   
D)  $T = m r^2 \omega$

Equilibrium



- A) Zero [2018]  
C) Maximum  
B) Clockwise  
D) remains the same

12. Two forces 5N and 10 N are acting at O and P respectively on uniform meter rod suspended at the position of center of gravity 50 cm mark as shown in the figure.



Then Find the position of point 'p' on meter

- A) 80 cm [2014]  
B) 10 N  
C) 75  
D) 65 cm

13. For a body to be in complete equilibrium [2010]

- A) Linear acceleration is zero  
B) Angular acceleration is zero  
C) Linear acceleration is zero but angular acceleration is not zero  
D) acceleration and angular acceleration both should be zero

#### Speed Velocity

14. Arshad is driving down 7th street. He drives 150 meters in 18 seconds. Assuming he does not speed up or slow down, what is his speed? [2017]

- A) 0.38m/s  
B) 126m/s  
C) 58.33m/s  
D) 8.33m/s

15. If the velocity of the body Changes by amount in equal intervals of time, the body is said to have: [2010]

- A) Variable acceleration  
B) Uniform acceleration  
C) Uniform velocity  
D) Negative acceleration

16. A body is moving with an initial velocity of 2  $\text{km s}^{-1}$ . After a time of 50 secs its velocity becomes 1.5  $\text{km s}^{-1}$ . Its magnitude of acceleration will be [2009]

- A)  $30 \text{ m s}^{-2}$   
B)  $40 \text{ m s}^{-2}$   
C)  $20 \text{ m s}^{-2}$   
D)  $10 \text{ m s}^{-2}$

#### Equation of Motion

17. A cyclist is travelling at  $15 \text{ m s}^{-1}$  she applies brakes so that she doesn't collide with Wall in front her

NUMS and National MDCAT by Ali Shady  
distance calculate the magnitude of deceleration

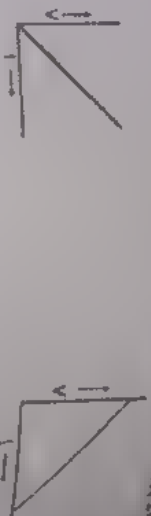
- A)  $6 \text{ m s}^{-2}$   
B)  $5 \text{ m s}^{-2}$   
C)  $1 \text{ m s}^{-2}$   
D)  $12 \text{ m s}^{-2}$

18. Distance travelled by a car moving with velocity  $10 \text{ m/s}$  in time 2 seconds, when it decelerates at the rate of  $2 \text{ m/s}^2$  is equal to

- A) 30m [2019]  
B) 34m  
C) 26m  
D) 16m

#### Velocity Time Graph

19. Which of the following v-t graph represents constant acceleration? [2017 Retake, 2019]



20. If slope of velocity time graph is not constant at different points, then body is moving with [2018]

- A) Uniform velocity  
B) Increasing acceleration  
C) Average acceleration  
D) Constant acceleration

21. The vertical velocity of ball thrown upward with time [2018]

- A) Decreases linearly.  
B) remains constant.  
C) Double  
D) Decreases parabolically

#### Newton's law of motion

22. Newton first law of motion is also known as [2018]

- A) Law of inertia  
B) Law of electromagnetic  
C) Law of universal gravity  
D) Law of conservation

#### Momentum And Law To Conservation Of

#### Momentum

23. If two objects of equal masses 'm' are moving towards each other with the same speeds 'v' that what will be the total final momentum after elastic

Need-on collision?

- A)  $m_1 \text{ kg s}$   
 B)  $m_2 \text{ kg m/s}$   
 C)  $0 \text{ kg s}$   
 D)  $0 \text{ kg m/s}$

Force and rate of change of momentum

A force of 12 N acts on a car and changes its momentum from 36 kgm/sec to 60 kgm/sec, the time during which this change occurs will be

- A) 2 sec  
 B) 2 sec  
 C) 8 sec  
 D) 8 sec

Elastic and inelastic collision

In elastic collision, when a massive body collides with light body at conditions  $m_1 \gg m_2$  and  $v_2 = 0$ , then the change in velocity will be written as

- A)  $v_1 - v_2 \approx -v_1; v_2 \approx v_1$   
 B)  $v_1 \approx v_1; v_2 \approx 0$   
 C)  $v_1 \approx v_1; v_2 \approx 2v_1$   
 D)  $v_1 \approx -v_1; v_2 \approx 0$

Projectile Motion and its Applications

The range of the projectile depends upon the velocity of the projection and the angle of the projection i.e.  $45^\circ$ . For a fixed velocity, when the angle of projection larger than  $45^\circ$ , which of the following is correct?

- A) both the height and the range attained by the projectile will be less  
 B) both the height and the range attained by the projectile will be more  
 C) The height attained by the projectile will be less but the range is more  
 D) The height attained by the projectile will be more but the range is less

Time of projectile's flight is

- A)  $\frac{v \sin \theta}{g}$   
 B)  $\frac{2v \sin \theta}{g}$   
 C)  $\frac{v^2 \sin \theta}{g}$   
 D)  $\frac{v^2 \sin \theta}{g}$

In order to determine the maximum height of the projectile, the equation of motion used is

- A)  $v^2 - u^2 = 2as$   
 B)  $v^2 - u^2 = 2as$   
 C)  $v^2 - u^2 = 2as$   
 D)  $v^2 - u^2 = 2as$

missile is called a ballistic missile.

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- A) 1m powered and guided  
 B) 1m powered and guided  
 C) 1m powered and guided  
 D) 1m powered and guided

Key and Solution

Answer: D

Total distance along circle  $2\pi r$

Distance is the total length between two points where displacement is the shortest distance

Answer: B

Value of torque is increasing

Answer: C

Answer: C

Answer: D

Answer: B

Answer: A

Answer: B

Answer: B

Answer: A

Answer: B

Answer: D

Answer: A

14. Answer: D-Solution:  $\text{Speed} = \frac{\text{distance}}{\text{time}} = \frac{150}{18} = 8.33 \text{ m/s}$

15. Answer: B-Solution: Uniform acceleration in which bodies cover equal velocity in equal interval of time

16. Answer: D-Solution:  $a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{50} = -\frac{5}{500} \times 1000 = -10 \text{ ms}^{-2}$

17. Answer: A-Solution:  $v_f = 15 \text{ m/s}, v_i = 0$

$S = 18 \text{ m}$

$2as = v_f^2 - v_i^2$

$a = \frac{v_f^2 - v_i^2}{2s}$

$a = \frac{0^2 - (15)^2}{2(18)} = \frac{-225}{36} = -6.3 \text{ ms}^{-2}$

18. Answer: C-Solution:

$v_f = 15 \text{ m/s}, a = 2 \text{ ms}^{-2}, t = 2 \text{ s}$

$S = v_i t + \frac{1}{2} a t^2$

$S = 15 \times 2 + \frac{1}{2} (2)(2)^2$

$S = 30 + 4 = 34 \text{ m}$

19. D-Solution: Acceleration is constant when velocity of body increases or decreases uniformly w.r.t (Graph A and C) Acceleration is constant, (a) (t) when velocity is constant (Graph B)

20. Answer: B-Solution:

If slope velocity time graph is not constant at different points then acceleration is not constant (may be increasing or decreasing)

21. Answer: A-Solution: In projectile motion compound velocity decreases linearly w.r.t time  $-V_y + a_y t$

22. A-Solution: Newton's first law of motion is law of inertia

23. Answer: D Solution: Final momentum  $Mv + m(-v) = 0$

24. Answer: B-Solution:  $p_{\text{ext}} = p_{\text{int}}$ ,  $12 \times 1 = 60 - 36$

$T = \frac{24}{12} = 2 \text{ s}$

25. Answer: C-Solution:  $m_1 \gg m_2, m_1 \gg m_2, v_2 = 0$

So by elastic collision in one dimension

$v_1 = -v_1, v_2 = 2v_1$

26. Answer: D-Solution:  $R \sin 2\theta$  Range is max at  $45^\circ$  so if the angle is greater than  $45^\circ$  then range increase but height increase because H at any angle

27. Answer: B-Solution: Formula of time of flight  $T = 2v_1 \sin \theta / g$

28. Answer: B-Solution: To find the maximum height projectile the equation of motion which is independent of time

$2as = v_f^2 - v_i^2$

29. D-Solution: Ballistic missiles are unpowered and guided

Work

Which of the following is statement shows that no work is done?

- Pushing a car to start it moving
- Writing an essay on a page
- Lifting the weights
- The moon orbiting the earth

Total work done in figure



- 1
- 2
- 3
- 4
- 5
- 6

- 24 Nm
- 16 Nm
- 8 Nm
- Zero Nm

Work done will be zero if angle between Force and displacement is

- $0^\circ$
- $60^\circ$
- $270^\circ$
- $360^\circ$

At what angle work done will be maximum

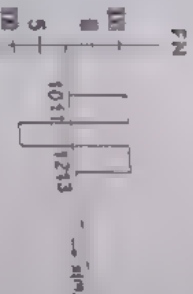
- $0^\circ$
- $90^\circ$
- $45^\circ$
- $30^\circ$

Answer: A-Solution: where  $\theta = 0^\circ$  ;  $W = Fd \cos(0)$

Which one of the following is a greater work?

- 100 J
- 100 J
- 1000 J
- 200 J

The figure shows the force distance curve of a body moving along a straight line. The work done by the force:



- 10 J
- 20 J
- 30 J
- 40 J

Graph A force  $2i + j$  has moved its point of application (2,3) to (6,5). What is work done

- 10
- +10

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C) 18

18. An automobile is moving forward with uniform velocity. The force exerted by its engine. If that force happens to its total power?

- It does not change
- It is halved
- It is squared
- It is doubled

The rate at which work is being done is called

- Power
- Density
- Energy
- Force

The consumption of energy by 60-watt bulb in 2 seconds is

- 20 J
- 120 J
- 30 J
- 0.02

Energy

If a certain force acts on an object and changes its kinetic energy from 65 J to 130 J then work done by the force will be:

- 92.5 J
- 97.5 J
- 65 J
- 130 J

The potential energy per unit volume is given by

- Mgh
- Mgh/p
- gh
- gh/p

If velocity is double, then,

- Momentum increase 4 times and KE increases 2 times
- Momentum and KE remain same
- Momentum increases 2 times and KE increase
- Constant
- Momentum increases 2 times and KE increases 4 times

Later conversion of P.E. and K.E.  
A stone of mass 2.0 kg is dropped from a rest position 5.0m above the ground. What is its velocity at a height of 3.0m above the ground?

- 12 m/s
- 9.3 m/s
- 10 m/s
- 15 m/s

If mass 'm' is dropped during downward motion and the force of friction during downward motion is



Is the velocity at bottom, following equation will be hold:

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A)  $\frac{1}{2}mv^2 = mgh + fh$  120171

6. Answer: A - Solution:  $W = 10 \times 1 + 10 \times 10 + 10$

B)  $mgh = \frac{1}{2}mv^2 - fh$

7. Answer: B - Solution:  $w = \vec{f} \cdot \vec{d}$ ,  
 $d = \vec{r}_2 - \vec{r}_1 = (6i + 5j) - (2i + 3j)$ ,  
 $d = 4i + 2j$ ,  
 $w = (2i + j) \cdot (4i + 2j)$   
 $= 8 + 0 + 0 + 2$   
 $W = 10J$

C)  $fh = mgh + \frac{1}{2}mv^2$

16. A body of mass 6 kg falls under action of gravity. At initial position its P.E. is 480 J and K.E. is 0 J. During its downward journey at point its energies will be ( $g = 10 \text{ ms}^{-2}$ )

8. Answer: D - Solution:

$P = \vec{f} \cdot \vec{v}$ ,  
 $P \propto F \Rightarrow P' \propto F'$   
If  $F' = 2F$ ,  
 $P' = 2P$

9. Answer: A - Solution: (power)  $P = \frac{dW}{dt}$

10. Answer: B - Solution:  $P = \text{Energy/Time}$   
 $P \times t = \text{Energy}$   
 $60 \times 2 = \text{Energy}$   
 $120J = \text{Energy}$

11. Answer: C - Solution:  $W = \Delta K.E$   
 $W = K.E_f - K.E_i = 130 - 65$   
 $W = 65J$

12. Answer: D - Solution:  $P = \frac{E}{t} = \frac{mgh}{t} = \rho gh$

13. Answer: D - Solution:  $V' = 2V$

$K.E' = \frac{1}{2}mv'^2$

$K.E' = \frac{1}{2}m(2v)^2$

$K.E' = 4\left(\frac{1}{2}mv^2\right)$

$K.E' = 4K.E$

$P' = mv'$

$P' = m(2v)$

$P' = 2mv$

$P' = 2P$

14. Answer: B - Solution:  $2as = v_f^2 - v_i^2$

$v_f = \sqrt{2g(h_2 - h_1)}$

$v_f = \sqrt{2 \times 9.8(2)}$

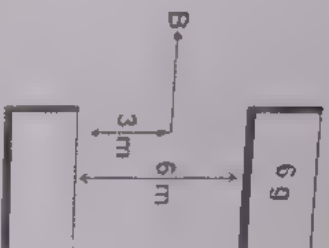
$v_f = 6.26 \text{ ms}^{-1}$

15. Answer: D - Solution: When the friction is present

P.E. work done against friction = K.E

P.E. K.E + work done against friction

16. Answer: B - Solution:  $P.E = mgh = 6 \times 10 \times 180$   
So  $K.E = T.E - P.E = 480 - 180 = 300J$



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- A) P.E. = 300J and K.E. = 180 J  
B) P.E. = 180J and K.E. = 300 J  
C) P.E. = 230 J and K.E. = 250 J  
D) P.E. = 250J and K.E. = 230J

Key and Solution

1. D-Solution: Moon orbiting the in a closed path and due to the gravitational force of earth. Gravitational force provides necessary centripetal force to orbit moon ground earth so  $w = Fd \cos \theta$   
 $F_d \cdot d$   
 $\theta = 90^\circ$   
 $w = 0$   
D-Solution: figure shows d = 0 because body come back to its original position so work done = f.d so  $W = 0$  (Work done in closed path is zero)  
Answer: C - Solution:  $W = Fd \cos \theta$
3.  $W = Fd \cos(0) = Fd$   
 $W = Fd \cos 60 = Fd/2$   
 $W = Fd \cos 270 = Fd(0) = 0$   
 $W = Fd \cos 360 = Fd$   
Answer: A - Solution: where  $\theta = 0^\circ$ ,  
 $w = Fd \cos(0) \Rightarrow W = Fd(\max)$   
Answer: C - Solution: work is negative that when  $\theta = 180^\circ - 1000J$  is maximum work (-) sign show force and displacement of are opposite
4. Answer: A - Solution: where  $\theta = 0^\circ$ ,  
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### Angular Displacement

A circle of radius 1m rolls through some distance making an angle 180° at the center. find the distance

- A) 1m [2019]  
B) 5m  
C) 14m  
D) 24m

An object is moving along a circular path of radius 1m. What will be its angular displacement if it moves 14m on this circular path?

- A) 3 radians [2019]  
B) 3.5 radians  
C) 5.0 radians  
D) 4.5 radians

A wheel starts rotating from rest with angular acceleration of 2 rad/s<sup>2</sup>. At its angular speed 6 rad/s. The angular displacement of the wheel will be equal to

- A) 4 rad [2018]  
B) 9 rad  
C) 12 rad  
D) 7 rad

The ratio of displacement along diameter and total distance along circle is:

- A) 1 [2017]  
B) 2  
C) 4  
D) 1/2

Radius is a unit of angular displacement which can also be measured in degrees. How many radians are equal to one degree?

- A) 180 π [2011]  
B) π/180  
C) 2 π/180  
D) π/57.3

A wheel of radius 1 m covers an angular displacement of 180°. Its linear displacement is

- A) 1.5m [2010]  
B) π rad  
C) 0.157 m  
D) 0.157 m

### ANGULAR VELOCITY

Which of the following gives the relationship between linear velocity and angular velocity?

- A)  $V = \omega r$   
B)  $V = r\omega$   
C)  $V = \omega$   
D)  $V = \theta$

A body moves in a circle with increasing angular velocity. At time t, after the angular velocity is 27 rad/s. What is the radius of circle made by the body where linear velocity is 81 cm/s?

[2017]

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B) 5m  
C) 14m  
D) 24m

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- A) 1m [2017]  
B) 5m  
C) 14m  
D) 24m

Key and Solution

Answer: A Solution:  $\omega = 27 \text{ rad/s}$ ,  $v = 81 \text{ cm/s}$

So  $r = \frac{v}{\omega} = \frac{81}{27} = 3 \text{ cm} = 0.03 \text{ m}$

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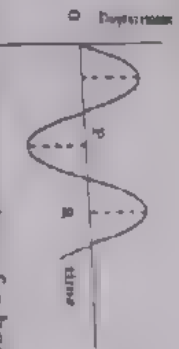
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2. Answer: B-Solution:  $S=r\theta$ ,  $\theta = \frac{s}{r} = \frac{14}{4} = 3.5$
3. Answer: B-Solution:  $2\theta\alpha = \omega f^2 - \omega i^2$ ,  $\omega i = 0$   
 $\theta = \frac{\omega f^2}{2\alpha} = \frac{6^2}{2(2)} = \frac{36}{4} = 9 \text{ rad}$
4. Answer: D-Solution: (along diameter)  $|d| = 2r$   
 Distance along circle  $= 2\pi r$   
 $\frac{s}{2\pi r} = 1: \pi$
5. Answer: B-Solution:  $2\pi \text{ rad } 360^\circ$   
 $\frac{2\pi}{360} \text{ rad} = 1^\circ$
6. Answer: A-Solution:  $S = r\theta$ ,  $\theta = 180^\circ = \pi \text{ rad}$   
 So  $s = 1 \times \pi = 1 \times 3.14 = 3.14 \text{ m}$
7. Answer: A-Solution: relation between linear and angular velocity is  $v = r\omega$

## Chapter 5: OSCILLATION

### Simple Harmonic Motion

1. In simple harmonic motion, acceleration will be maximum, when object is at [2019]  
 A) Maximum displacement from the mean position  
 B) Center position  
 C) Mean position  
 D) Half of the maximum displacement from mean position



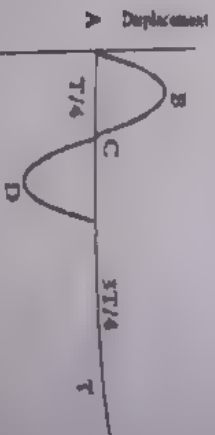
2. Simple harmonic motion of a body is described by which statement mentioned below [2018]  
 K: K.E is maximum when displacement  $x=0$  L: P.E is maximum when  $x=0$   
 M: P.E is maximum when  $x = \pm a^3$   
 A) K and L  
 B) K and M  
 C) K, L and M  
 D) L and M
3. If the time period of the oscillation is 20 micro-sec, than what will be the frequency of that oscillating body [2018]  
 A) 5000 Hz  
 B) 50000 Hz  
 C) 20000 Hz  
 D) 1000 Hz
4. A body performing SHM with displacement  $x = x_0 \sin(\omega t + \phi)$  when  $t = 0$ ,  $x = x_0$ . What

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8. Answer: B-Solution:  $v = r\omega$ ,  $r = \frac{v}{\omega}$   
 $\omega = \frac{2\pi}{T}$   
 $r = \frac{v}{\omega} = \frac{vT}{2\pi}$
9. Answer: A-Solution: angular speed  $= \frac{\text{angular displacement}}{\text{time}}$   
 So  $\omega = \frac{2\pi \text{ rad}/60 \text{ min}}{10 \text{ min}} = \frac{\pi}{30} \text{ rad/s}$
10. Answer: A-Solution:  $v = r\omega$
11. Answer: D-Solution:  $r = \left(\frac{GM}{\omega^2}\right)^{\frac{1}{3}}$   
 $r = \left(\frac{6.67 \times 10^{-11} \times 7.35 \times 10^{22}}{(2\pi)^2 \times 27.4 \times (24 \times 3600)^2}\right)^{\frac{1}{3}}$   
 $r = 8.86 \times 10^7 \text{ m}$
12. Answer: D-Solution:  $w = f d \cos \theta$ ,  $\theta = 90^\circ$   
 $w = f d \cos 90^\circ = 0$
13. Answer: C
14. Answer: D

is the value of phase angle  $\phi$

- A)  $\pi$  [2017]  
 B)  $\frac{\pi}{4}$   
 C)  $-\pi$   
 D)  $\pi/2$
5. At  $t = 0$  a body performing simple harmonic motion is at mean position; when  $t = T/4$ , it will be [2008/2013]  
 A) Between mean and extreme position  
 B) Again at mean position  
 C) Beyond extreme position  
 D) At extreme position
6. A simple harmonic oscillator has a time period of 10 seconds. Which equation relates its acceleration 'a' and displacement 'x'? [2011]  
 A)  $a = -10x$   
 B)  $a = -(20\pi)^2 x$   
 C)  $a = -\left(\frac{2\pi}{10}\right)^2 x$   
 D)  $a = -(20\pi)^2 x$
7. Waveform of SHM is given in figure. The time/times B displacement is equal to zero? [2011]



- A) T/4 only  
 B) 3T/4 only  
 C) 0, T/4, 3T/4 and T  
 D) 0, T/2 and T

Answer: A-Solution: The displacement is zero when the body is at the mean position. In the given graph, the displacement is zero at points B, C, and D. The time interval between B and D is 3T/4. Therefore, the displacement is zero at 0, T/4, 3T/4, and T.

Answer: D-Solution: The time period of the oscillation is 20 micro-sec. The frequency of the oscillation is  $f = \frac{1}{T} = \frac{1}{20 \times 10^{-6}} = 50000 \text{ Hz}$ .

Answer: A-Solution: The angular velocity is  $\omega = \frac{2\pi}{T} = \frac{2\pi}{20 \times 10^{-6}} = 100000 \text{ rad/s}$ .

Answer: D-Solution: The displacement is zero at points B, C, and D. The time interval between B and D is 3T/4. Therefore, the displacement is zero at 0, T/4, 3T/4, and T.

In the diagram below, the displacement of an oscillating particle is plotted against time. What does the length 'PPK' on the time axis represent?

- A) Twice the frequency  
B) Half the frequency  
C) Half the period  
D) Twice the period
- In a simple Harmonic Motion with a radius 'x', the velocity of the particle at any point is

A)  $v = \sqrt{x_0^2 - x^2}$  [2009]  
B)  $v = \omega(x^2 - x_0^2)$   
C)  $v = \omega \sqrt{x_0^2 - x^2}$   
D)  $v = \omega \sqrt{x - x_0}$

The velocity and acceleration of a particle performing S.H.M have a steady phase relationship. The acceleration show a phase lead over the velocity of

- A)  $\pi$   
B)  $\pi/2$  [2008]  
C)  $\pi/2$   
D)  $\pi$

Mass Spring System

In mass spring system, mass 'm' is attached with spring of constant 'k' with time period 'T'. Then mass is replaced by '2m' with the same spring. What will be the time period 'T<sub>2</sub>'?

- A)  $T_2 = \sqrt{2}T_1$  [2017]  
B)  $T_2 = T_1$   
C)  $T_2 = 2T_1$   
D)  $T_2 = 2T_1/\sqrt{2}$

Mathematical formula of maximum velocity (V<sub>m</sub>) for a body executing simple harmonic motion is

- A)  $v_0 = \omega x_0$  [2015]  
B)  $v_0 = \frac{k}{m} \sqrt{x_0^2 - x^2}$   
C)  $v_0 = \sqrt{1 - x^2/x_0^2}$   
D)  $v_0 = \omega \sqrt{x_0^2 - x^2}$

What is the period of mass spring system during SHM if the ratio of mass to spring constant is  $\frac{1}{4}$

- A)  $\pi$  [2011]  
B)  $2\pi$   
C)  $1/\pi$   
D)  $\frac{1}{2}\pi$

The vertical extension in a light spring by a weight of 1 kg suspended from the wire is 9.8cm, the period of the oscillation is

- A) 20  $\pi$  sec  
B) 2  $\pi$  sec [2010]  
C)  $\frac{2\pi}{10}$   
D) 200  $\pi$  sec

If the mass attached with a spring becomes 4 times, the period of vibration becomes

- A) One fourth  
B)  $\frac{1}{4}$   
C) Half  
D) Double

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SAMPLE PAPER  
16. When the length of simple pendulum is doubled, then ratio of its new time period to old time period is

- A)  $2\sqrt{2}$  [2019]  
B)  $\sqrt{2}$   
C)  $\sqrt{2}$   
D)  $1/\sqrt{2}$

The time period 'T' of a simple pendulum depends on its length 'l' and acceleration due to gravity 'g' using unit or dimension the correct equation for time period is

- A)  $T = k \sqrt{\frac{l}{g}}$  Where 'K' is constant [2016]  
B)  $T = k \sqrt{\frac{l}{g}}$  Where 'K' is constant  
C)  $T = \frac{l}{k \sqrt{\frac{l}{g}}}$  Where 'K' is constant  
D)  $T = \frac{l}{k \sqrt{\frac{l}{g}}}$  where 'K' is constant

What should be the length of a simple pendulum whose period is 6.28 second at a place where  $g = 10 \text{ m/s}^2$ .

- A) 9.8 m [2015]  
B) 10.8 m  
C) 6.28 m  
D) 10m

Frequency of simple pendulum of length 9.8m will be

- A) 2 $\pi$  Hertz [2014]  
B)  $\frac{\pi}{2}$  Hertz  
C)  $\frac{1}{2\pi}$  Hertz  
D)  $\frac{\pi}{4}$  Hertz

When the length of a simple pendulum is doubled, find the rate of the new frequency to the old frequency

- A)  $\frac{1}{4}$  [2012]  
B)  $\frac{1}{2}$   
C)  $\sqrt{2}$   
D)  $\frac{1}{2}$

In a simple pendulum, the tension in the string is

- A)  $mg \sin \theta$   
B)  $mg \cos \theta$   
C)  $mg \cos \theta$   
D)  $g \theta$

Energy (conservation)  
22. In S.H.M the kinetic energy of the body is minimum when

- A) The body is at mean position [2018]  
B) The body is at extreme is at extreme position from the mean  
C) The body is at extreme is at extreme position from the mean  
D) The body is at extreme is at extreme position from the mean

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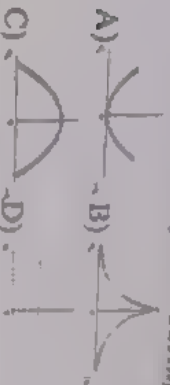
- C) The body is exactly half way down between mean and extreme position  
D) The body is somewhere between mean and extreme position
23. What should be the ratio of kinetic energy to total energy for simple harmonic oscillator?

A)  $(1 - \frac{x^2}{x_0^2})$  [2015]  
B) 1  
C)  $(\frac{x_0^2}{2} - x^2)$   
D)  $\frac{1}{2} x^2$

24. Potential energy of a mass spring system with respect to displacement in simple harmonic motions (SHM) is shown in the figure.



Which of the following represents the total energy of mass spring system during SHM?



25. Variation of amplitude with respect to time for an oscillating object is shown figure



A) Damped  
B) Critical  
C) Un-damped  
D) heavily damped

26. A particle executes S.H.M with frequency f. If the frequency of Variation of its maximum or minimum kinetic energy is:

A)  $f/2$   
B) f  
C)  $2f$   
D)  $4f$

### Resonance

27. When the frequency of the applied force becomes equal to one of natural frequency of the body then the body oscillates with maximum displacement this phenomenon is called

- A) Healing  
B) Resonance  
C) Reverberation  
D) Bumping
28. Resonance occurs when the driving frequency is

29. Tuning a radio is an example  
A) Greater than natural frequency  
B) Less than natural frequency  
C) Unequal the natural frequency  
D) Equal to the natural frequency

30. a body performs simple harmonic motion with period of 0.063s. The maximum speed to the body is 3.0 ms<sup>-1</sup>. What are the values of the amplitude  $x_0$ (m) and angular frequency  $\omega$  (rad s<sup>-1</sup>)

31. Food being cooked in microwave oven is an example of  
A) Beats  
B) Overtones  
C) Resonance  
D) stationary

32. In a microwave oven, the wave produced has wavelength of 12 cm at a frequency of

A) 2452 Hz  
B) 2456 Hz  
C) 2455 Hz  
D) 2450 Hz

### Key And Solutions

1. Answer: A-Solution:  $a = -w^2 x$ ,  $x = x_0$ ,  $a = -w^2 x_0$

So acceleration is maximum at extreme position

2. Answer: B-Solution: P.E is maximum at extreme position

3. Answer: B-Solution:  $f = \frac{1}{T} = \frac{1}{20 \times 10^{-6}} = \frac{10^6}{20} = 50000 \text{ Hz}$

4. Answer: D-Solution:  $x = x_0$  at  $t = 0$  body in motion from extreme position so  $\theta = \frac{\pi}{2}$

$$x = x_0 \sin(\omega t + \frac{\pi}{2})$$

5. Answer: D-Solution: At  $t = 1/4$ ,  $\theta = \frac{2\pi}{T}$  so  $\theta = \frac{\pi}{2}$

$$90^\circ$$

$$50 \text{ x} = x_0 \sin \theta = x_0 \sin 90 = x_0$$

6. Answer: C-Solution:  $a = -w^2 x = -(\frac{2\pi}{T})^2 x$

$$-\left(\frac{2\pi}{10}\right)^2 x$$

7. Answer: D-Solution:  $t = 0$ ,  $T/2$ ,  $T$ ,  $x = 0$  (extreme position) at  $t = T/4$ ,  $3T/4$ ,  $x = x_0$  (extreme position)

8. Answer: B-Solution: PR is on time axis and its period

9. Answer: A

10. Answer: C

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of the amplitude

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of:

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$X_0, D =$

Position

at CVCT

both

$\theta = \frac{\pi}{2}$

$\left(\frac{\pi}{2}\right)^2 =$

11. Answer: A -Solution:  $T_2 = 2\pi \sqrt{\frac{m}{k}}$

so  $T_2 = \sqrt{2}T_1$

12. Answer: A -Solution:  $v = w \sqrt{x_0^2 - x^2}$

when  $x = 0$  (mean)

13. Answer: A Solution:  $T = 2\pi \sqrt{\frac{m}{k}}$

$T = 2\pi \sqrt{1/4} = \frac{2\pi}{2} = \pi$

14. Answer: C -Solution:  $T = 2\pi \sqrt{\frac{m}{k}}$

$T = \pi$

$\sqrt{2} = \pi$

$\pi = \pi$

$\pi = 2\pi \sqrt{\frac{x}{k}} = 2\pi \sqrt{\frac{9.8/100}{k}}$

$T = \frac{2\pi}{10}$

15. Answer: D, Solution  $\rightarrow T \propto \sqrt{m}$

$\omega = 4\pi$

$T \propto \sqrt{4}$

16. Answer: C, Solution:  $T = 2\pi \sqrt{\frac{1}{g}}$

$T = \alpha \sqrt{l}$

$l = 2l$

Then  $T \propto \sqrt{2}$ , so  $T = \sqrt{2}T$

17. Answer: B

18. Answer: D -Solution:

$T = 2\pi \sqrt{\frac{l}{g}}$

$\frac{2\pi \sqrt{4l^2}}{g}$

$\frac{gT^2}{4\pi^2} = L$

$\frac{9.8(6.28)^2}{4(3.14)^2} = L$

So

$L = \frac{(9.8)(6.28 \times 6.28)}{4 \times 9.2}$

$L = 10m$

$L = 10m$

# UNIT 6: WAVES

A) 80 km

H) 130 km

C) 100 km

D) 120 km

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19. Answer: C -Solution:

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}} = \frac{1}{2\pi} \sqrt{\frac{9.8}{L}}$

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}} = \frac{1}{2\pi} \sqrt{\frac{9.8}{L}}$

20. Answer: B -Solution:

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$

$f = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$

21. Answer: B

From fig

$T = \frac{2\pi}{\omega} \cos \theta$

22. Answer: A

23. Answer: A, Solution:

$K = \frac{1}{2} k x^2 (1 - x^2)$

$T = \frac{1}{2} k x^2$

$(1 - x^2)$

24. Answer: D -Solution: Total energy always remains constant with displacement.

25. Answer: C

26. Answer: C -Solution:

For a cycle K.E is maximum (vel and minimum two times so its frequency is double as compared to SHM having frequency f

27. Answer: B

28. Answer: D

29. Answer: D

30. Answer: Solution:  $v = \omega \lambda$ ,  $\omega = 2\pi/T$

31. Answer: C

32. Answer: D

The wavelength of the electromagnetic wave having frequency of 3 kHz will be

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A shock wave is produced due to an earthquake which makes the building the direction of the shock wave. Which progressive wave would this be?

- A) Longitudinal wave  
B) Transverse wave  
C) Material wave  
D) Particle wave

[2018]

If a wave travelling at a speed of 130 m/s and has a wavelength of 5m, then find out the frequency of the wave?

- A) 650 Hz  
B) 26 Hz  
C)  $3 \times 10^4$  Hz  
D) 26 Hz

[2017]

Speed of light, radio waves and microwaves in vacuum is:

- A)  $3 \times 10^5 \text{ ms}^{-1}$   
B)  $3 \times 10^3 \text{ ms}^{-1}$   
C)  $3 \times 10^6 \text{ ms}^{-1}$   
D)  $3 \times 10^8 \text{ ms}^{-1}$

[2010]

Speed of the waves is equal to

- A)  $f\lambda$   
B)  $\frac{\lambda}{f}$   
C) Both A and B  
D)  $\lambda T$

[2010]

Transverse waves cannot be setup in

[2008]

- A) Metals  
B) Solids  
C) Fluids  
D) Soil

### Principle Of Superposition

For a certain organ pipe, three successive resonances are frequencies are observed at 425, 595 and 765 Hz. The speed of the sound in air 300 m/s.

The pipe [2018]

- A) closed Pipe of length 1m  
B) closed pipe of length 2m  
C) Open pipe of length 1m  
D) Open pipe of length 2m

A metallic wire of 2m length hooked between two points has tension of 10N. If mass per unit length of wire is 0.004 kg/s then fundamental frequency emitted by wire on vibration is [2017]

- A) 12.5 Hz  
B) 48 Hz  
C) 24 Hz  
D) 6.25 Hz

A pipe closed at one end has length 25cm. the wavelength of first harmonic will be [2017]

- A) 25cm  
B) 50cm  
C) 100cm  
D) 200cm

Two waves of same amplitude are traveling in the same direction and are out of phase. their resultant

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wave is:

- A) Zero  
B) 1 unit to difference of their amplitudes  
C) Equal to sum of their amplitudes  
D) Equal to half of their

[2011]

An organ pipe closed at one end has a length of 100 cm. wavelength of the fundamental note is

- A) 25cm  
B) 50cm  
C) 100cm  
D) 75cm

[2014]

A 2m long pipe is open at both ends. What is its harmonic frequency

- A) 42.5 Hz  
B) 85 Hz  
C) 220 Hz  
D) None of these

[2009]

A standing wave pattern is formed when the length of string is an integral multiple of wavelength

- A) Triple  
B) Full  
C) Half  
D) Double

[2009]

### DOPPLER EFFECT

What will be the expression for the observed frequency, if the source is moving towards the observer?

- A)  $f_o = \left( \frac{v}{v - u_o} \right) f$   
B)  $f_o = \left( \frac{v}{v + u_o} \right) f$   
C)  $f_o = \left( \frac{v - u_o}{v} \right) f$   
D)  $f_o = \left( \frac{v}{v - u_o} \right) f_o$

[2019]

The red shift measurement of Doppler effect in galaxies indicate that universal is

[2016]

- A) Expanding  
B) Contracting  
C) Stationary  
D) Oscillating

An observer moves with velocity towards a stationary source, then the number waves received in one second is

[2015]

- A)  $f' = f \left( \frac{v}{v + u_o} \right)$   
B)  $f' = f \left( \frac{v}{v - u_o} \right)$   
C)  $f' = f \left( \frac{v + u_o}{v} \right)$   
D)  $f' = f \left( \frac{v - u_o}{v} \right)$

When the source of sound moves towards the stationary observer, the value of apparent frequency ' $f_o$ ' is

[2013]

- A)  $f_o = \left( v + \frac{u}{v} \right) f$   
B)  $f_o = \left( \frac{v}{v} \right) f$   
C)  $f_o = \left( \frac{v}{v + u_2} \right) f$   
D)  $f_o = \left( \frac{v}{v} \right) f$

source of wave is moving towards the observer

the wavelength is found in laboratory

19. A sound speed of sound is found in laboratory

20. A sound speed of sound is found in laboratory

21. What distance

22. What distance

23. What distance

24. What distance

25. What distance

26. What distance

27. What distance

28. What distance

29. What distance

30. What distance

# AI & All Series

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A source of sound wave emits waves of frequency  $f$ . If  $v$  is speed of sound wave, then what will be the wavelength of the wave

- (A)  $v/f$  (B)  $vf$  (C)  $v/f^2$  (D)  $vf^2$

The spectrum of stars light is measured and the wavelength of one of the lines is the sodium line is found to be 589 nm. The same line has the wavelength of 497 nm when observed in the laboratory. This means the star is

- (A) Moving away from the earth (B) Moving towards the north (C) Stationary (D) Revolving around the planet

A sound moves towards a stationary observer with speed one third of sound. If the frequency of the sound from the source is 10Hz, the apparent frequency of the sound heard by the observer

- (A) 6 Hz (B) 10 Hz (C) 20 Hz (D) 15 Hz

What is it that we use to calculate the speeds of distant stars and galaxies?

- (A) Doppler effect (B) Interference (C) Beats (D) All of the above

## Key And Solution

1. C-Solution:  $v = f\lambda \Rightarrow \lambda = \frac{v}{f} = \frac{331}{300} = 1.104m$

2. A-Solution: According to definition of longitudinal wave those waves in which path of medium vibrates along direction of propagation of wave

3. D-Solution:  $v = f\lambda \Rightarrow f = \frac{v}{\lambda} = \frac{330}{130} = 26Hz$

4. Answer: D

## UNIT 7: Light

## INTERFERENCE

1. Path difference for the destructive interference can be written as

- (A)  $\Delta s = n\lambda$  (B)  $\Delta s = (n + \frac{1}{2})\lambda/2$  (C)  $\Delta s = 2n(\lambda)$  (D)  $\Delta s = (2n + 1)\lambda/2$

If general equation for destructive interference is given by the relation (Optic path difference)  $= (m + \frac{1}{2})\lambda$ , Where 'm' is an integer, then first dark

11. A and National NEET AI by All India

1. Solution:  $f\lambda = v \Rightarrow \lambda = \frac{v}{f} = \frac{340}{1700} = 0.2m$

2. Solution: For destructive wave the path difference must be odd multiple of  $\frac{\lambda}{2}$ . If the path difference is  $\lambda$ , then the path difference is  $2 \times \frac{\lambda}{2} = \lambda$ . So, the path difference is  $\lambda$ .

3. Solution: For both end close pipe  $\lambda = \frac{2L}{n}$

4. Answer: A-Solution:  $f = \frac{1}{2L} \sqrt{\frac{T}{\mu}} = \frac{1}{2 \times 0.5} \sqrt{\frac{100}{0.01}} = 12.5Hz$

5. A-Solution: when two waves are out of phase superpose of same amplitude their resultant will be zero

6. C-Solution: For both end close pipe  $\lambda = \frac{2L}{n}$

7. A-Solution: For both end open pipe  $f = \frac{nv}{2L}$

8. A-Solution: For both end open pipe  $f = \frac{nv}{2L}$

9. B-Solution: moves towards the stationary observer

10. Answer: A-Solution:  $v = f\lambda \Rightarrow \lambda = \frac{v}{f} = \frac{340}{1700} = 0.2m$

11. A-Solution:  $\lambda_{observed} > \lambda_{actual}$

12. Answer: A

Fringe appear for 'm' will be equal to

- (A) 2 (B) 4 (C) 1 (D) 1

Answer: C-Solution: Path difference  $= (m + \frac{1}{2})\lambda$  put  $m = 0$

An oil film floating on water surface exhibits color pattern due to the Phenomenon of

- (A) Interference (B) Polarization



4. For interference of light waves to take place, the required condition is
- D) Surface tension

[2011]

- A) The path difference of the light waves from the two sources must be large  
 B) The interfering waves must be non coherent  
 C) The light waves may come from different sources  
 D) The light waves must come from two coherent sources
5. In Newton ring apparatus, at the point of contact of the lens and glass plate, the additional path difference introduced is

[2010]

- A)  $\frac{\lambda}{4}$   
 B)  $\frac{\lambda}{2}$   
 C)  $\lambda$   
 D)  $\lambda/3$

### YOUNG'S DOUBLE SLIT MODEL

6. In double slit experiment, the fringe spacing of the diffracted rays increases when:

[2019]

- A) the distance between the screen and the slits decrease  
 B) the wavelength of the diffracted rays increases  
 C) the distance from mid points of the slits to the central point of the fringe on the screen increases  
 D) the distance between the slits increases
7. If a light is emitted by a single source passes through two narrow slits 1.00 mm apart. The interference pattern is observed on a screen 200 cm away and the separation between the centers of adjacent bright fringes is 2.00 mm. What would be the wavelength of the light?

[2019]

- A) 2  $\mu\text{m}$   
 B) 1  $\mu\text{m}$   
 C) 2 nm  
 D) 1 nm

8. Coherent light emerge from two fine parallel slit 'A' and 'B' as shown in the figure



If 'P' is the position of 'n' dark fringe from the centre of interference pattern then the phase

difference between the wave train from A and 'B' is

- A)  $n\pi$  radian  
 C)  $2n\pi$  radian

- B)  $(2n+1)\pi$   
 D)  $(n+\frac{1}{2})\pi$

9. For bright fringe formation the path difference is

- A)  $(n + \frac{1}{2})\lambda$  where  $n = 0, 1, 2, \dots$   
 B)  $n\lambda$  where  $n = 0, 1, 2, \dots$   
 C)  $(2n + 1)\frac{\lambda}{2}$  where  $n = 0, 1, 2, \dots$   
 D)  $(n + \frac{1}{2})\lambda_2$  where  $n = 0, 1, 2, \dots$

10. In Young's double slit experiment, the path difference BD for destructive interference is

- A)  $(m + \frac{1}{2})\lambda$   
 B)  $m\lambda$   
 C)  $2\lambda$   
 D)  $3\lambda$

[2015]

11. The distance between two bright or two adjacent fringes is mathematically written as

- A)  $\Delta y = \frac{2L}{d}$   
 B)  $\Delta y = \frac{\lambda}{d}$   
 C)  $\Delta y = \frac{\lambda d}{L}$   
 D)  $\Delta y = \frac{d}{\lambda L}$

[2019]

12. In Young's double slit experiment, slit separation is 0.05 cm, distance between screen and the D=200 cm, fringes separation  $x=0.13$  cm, then the wavelength ' $\lambda$ ' of light ray is

[2015]

- A)  $\lambda = 1.33 \times 10^{-2} \text{ m}$   
 B)  $\lambda = 3.25 \times 10^{-2} \text{ m}$   
 C)  $\lambda = 4.55 \times 10^{-3} \text{ m}$   
 D)  $\lambda = 5.1 \times 10^{-5} \text{ m}$

13. A yellow light of wavelength 500 nm emitted by a single source passes through two narrow slits 1 mm apart. How far apart are two adjacent bright fringes when interference is observed on a screen 10 m away?

[2008]

- A) 5 mm  
 B) 3.3 mm  
 C) 0.5 mm  
 D) 50 mm

14. In Young's Double Slit Experiment, if the distance between slits and screen is doubled, then fringe spacing becomes

[2008]

- A) Zero  
 B) One  
 C) Doubles of the original value  
 D) Half of the original value

### Diffraction

16. In the diffraction of light round an obstacle, the angle of diffraction is increased when

A) The wavelength of incident light is increased [2014]

B) The amplitude of incident light wave is increased

C) The wavelength of incident light wave is increased

D) The amplitude of the incident light wave is decreased

17. The property of bending of light around an obstacle and spreading of light waves into geometric shadow of an obstacle is called:

A) Reflection [2011]

B) Refraction [2011]

C) Diffraction [2011]

18. A diffraction grating has 500 lines per mm. its grating element  $d$  is equal to

A)  $2 \times 10^{-6}$  m [2018]

B)  $2 \times 10^{-4}$  m

C)  $2 \times 10^{-2}$  m

19. Wavelength of light which produces second order spectrum on a diffraction grating on which some lines/cm are ruled at an angle of  $30^\circ$  will be equal to

A)  $1.5 \times 10^{-7}$  m [2017]

B)  $1.5 \times 10^{-6}$  m

C)  $1.5 \times 10^{-5}$  m

D)  $1.5 \times 10^{-4}$  m

20. The distance between atoms is  $0.30$  nm. What will be the wavelength of x-rays at angle  $\theta = 30^\circ$  for 1st order diffraction?

A)  $0.30$  nm [2014]

B)  $0.60$  nm

C)  $0.90$  nm

D)  $1.20$  nm

21. What is the formula for critical angle in case of light through two medium having refractive indices  $n_1$  and  $n_2$  such that  $n_1 > n_2$ ?

A)  $\sin^{-1} \left( \frac{n_2}{n_1} \right)$  [2013]

B)  $\cos^{-1} \left( \frac{n_2}{n_1} \right)$

22. The information from one place to another can be transmitted very fast and easily by

A) Light [2010]

B) Sound

C) Heat

D) Electricity

23. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

24. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

25. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

26. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

27. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

28. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

29. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

30. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

31. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

32. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

33. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

34. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

35. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

36. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

37. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

38. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

39. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

40. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

41. Answer: B. Solution:  $\Delta y = \frac{\lambda}{d} \Rightarrow \Delta y \propto \lambda$

# UNIT 8: HEAT AND THERMODYNAMICS

KMIT

1. Which of the following is a postulate of kinetic theory of gases:

- A) A finite volume of a gas consists of a small number of molecules [2012]
  - B) The Size of the molecules is much larger than the separating between them
  - C) Molecules do not exert force on each other except during a collision
  - D) The gas molecules are in no random motion
2. Which one of the following is a postulate of kinetic theory of gases?
- A) Molecules do not exert force on each other [2010]
  - B) The size of molecules is much larger than Separation between the molecules
  - C) A finite volume of gas consists of a very small number of molecules
  - D) The as molecules are not in random motion

## Pressure Of Gas

3. Estimate pressure of air molecules at 273K, If the mean square speed is  $\langle v^2 \rangle = 500\pi^2/s^2$  and density of air under these conditions is  $6\text{kg}/m^3$  [2017]

- A)  $2.5 \times 10^2 \text{ Pa}$
- B)  $1 \times 10^3 \text{ pa}$
- C)  $1 \times 10^2 \text{ Pa}$
- D)  $2.7 \times 10^3 \text{ Pa}$

4. Two samples of gasses '1' & '2' are taken at same temperature and pressure but the ratio of number their volume is  $V_1:V_2 = 2:3$ , what is the ratio of number of moles of gas sample? [2015]

- A) 3:2
- B)  $\sqrt{2}:\sqrt{3}$
- C) 4:9
- D) 2:3

5. Root mean square velocity of a gas having pressure 'p' and density 'p' is given by [2015]

- A)  $\sqrt{\frac{3p}{p}}$
- B)  $\frac{3p}{p}$
- C)  $\frac{3p}{p}$
- D)  $\sqrt{\frac{3p}{p}}$

6. In general gas equation  $PV = nRT$ , n represents the number of moles of gas. Which of the following represents the relation of n? [2014]

A)  $n = N/V$

C)  $n = N_A/N$

7. Cubic container having length of each side 1m is the density of gas contained in cube?

- A)  $N/V$
- B)  $n = \frac{N}{V}$
- C)  $n = N_A/N$
- D)  $n = N + N_A$

8. The value of universal gas constant is: [2013,2010,2008]

- A)  $8.314 \text{ J mol}^{-1}\text{K}^{-1}$
- B)  $8.32 \text{ J mol}^{-1}\text{K}^{-1}$
- C)  $100 \text{ J mol}^{-1}\text{K}^{-1}$
- D)  $1.38 \times 10^{-23} \text{ J mol}^{-1}\text{K}^{-1}$

9. A gas sample contains three molecules, each having speed 1m/s, 2m/s and 3m/s [2013]

- A) 14/3m/s
- B) 6m/s
- C) 2m/s
- D)  $\sqrt{\frac{34}{3}}\text{m/s}$

10.  $H_2$  and  $O_2$  both are at thermal equilibrium at temperature 300 K. Oxygen molecule is 16 times massive than hydrogen. Root mean square speed of hydrogen is: [2011]

- A) 4 times root mean square of oxygen
- B)  $\frac{1}{4}$  root mean square of oxygen
- C)  $\frac{1}{16}$  root mean square of oxygen
- D) 16 root mean square of oxygen

11. Which of the following is expression of mean square speed of 'N' gas molecules contained in a cylinder? [2011,2012]

- A)  $\frac{v_1^2 + v_2^2 + \dots + v_N^2}{N}$
- B)  $\sqrt{\frac{v_1^2 + v_2^2 + \dots + v_N^2}{N}}$
- C)  $\frac{v_1 + v_2 + \dots + v_N}{N}$
- D)  $\sqrt{\frac{v_1^2 + v_2^2 + \dots + v_N^2}{N}}$

12. For a gas of volume V in its equilibrium state, if the pressure does change with time then total kinetic energy of gas is constant because [2011]

- A) Collisions between gas molecules occur

14. Collisions between gas molecules occur linearly  
 a) Collisions must be elastic  
 b) Collisions must be inelastic  
 c) Collisions must be linearly  
 d) Collisions must be inelastic

Equation Of State for Ideal Gas  $PV = nRT$

15. The value of pressure and volume of fixed mass of gas in thermometer at triple point of water  $p_f = 1.00 \times 10^5 \text{ Pa}$  and  $v_f = 1 \times 10^{-3} \text{ m}^3$ . when  $p = 1.1 \times 10^5 \text{ Pa}$  and  $v = 1.2 \times 10^{-3} \text{ m}^3$ . Temperature of gas is

- A) 361K [2017]  
 B) 298K  
 C) 273K [2014]  
 D) 250K

16. One mole of gas occupies volume  $1 \times 10^{-2} \text{ m}^3$  in cylinder whose pressure is  $2.5 \times 10^5 \text{ Pa}$ . The temperature of cylinder will be equal to

- A) 300K [2017]  
 B) 227K  
 C) 370K  
 D) 390K

17. The relation ' $PV = nRT$ ' shows which law of physics?

- A) Charles' law [2016]  
 B) Avogadro's law  
 C) Newton's constant  
 D) deal gas law

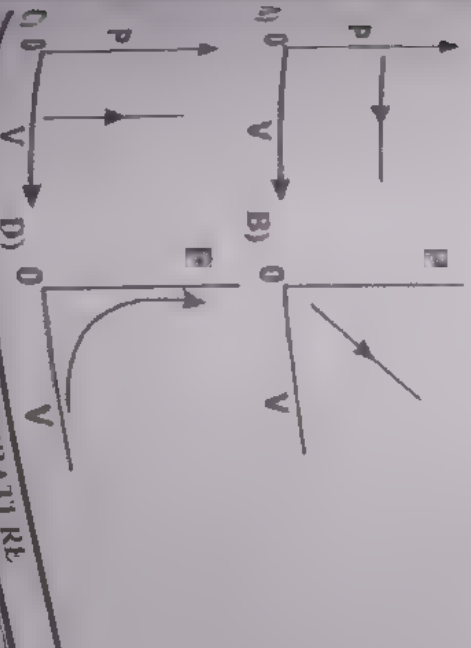
18. In general gas equation  $PV = nRT$ ,  $n$  represents the number of moles of gas, which of the following represents the relation of  $n$ ?

- [2014]  
 A)  $n = N/N_A$   
 B)  $n = N/N_A$   
 C)  $n = N_A/N$   
 D)  $n = N \cdot N_A$

19. At triple point of water, the pressure of gas is 2680 Pa, by Changing T, the pressure increase to 4870 Pa, then, T is

- [2014]  
 A) 496.38 K  
 B) 438.96 K  
 C) zero  
 D) 496.380F

20. Which of the following curve is an isotherm? [2011]



INTERPRETATION OF TEMPERATURE

21. Molecules of a gas at constant pressure for a fixed amount of gas has average kinetic energy  $X$ . Increasing temperature from  $27^\circ\text{C}$  to  $327^\circ\text{C}$ , average K.E. of molecules will become

- A)  $20X$  [2019]  
 B)  $20X$   
 C)  $30X$   
 D)  $2X$

22. Find the mean translational kinetic energy of ideal hydrogen gas at  $17^\circ\text{C}$ .

- A)  $6.21 \times 10^{19} \text{ J}$  [2018]  
 B)  $5 \times 10^{-21} \text{ J}$   
 C)  $6.21 \times 10^{13}$   
 D)  $6 \times 10^{-21} \text{ J}$

23. The relation  $\frac{E}{N_A} = 1.38 \times 10^{-23} \text{ J K}^{-1}$  in a gas law is known as

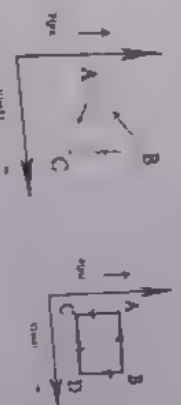
- A) Avogadro's constant [2016]  
 B) Charles constant  
 C) Newton's constant  
 D) Boltzmann's constant

24.  $\text{H}_2$  and  $\text{O}_2$  both are at thermal equilibrium at temperature  $300 \text{ K}$ . Oxygen molecule is 16 times massive than hydrogen, Root mean square speed of hydrogen is

- [2012]  
 A) 4 times root mean square of oxygen  
 B)  $\frac{1}{4}$  root mean square of oxygen  
 C)  $1/16$  root mean square of oxygen  
 D) 16 root mean square of oxygen

25. The sum of all forms of molecular energies (kinetic and potential) of a substance is termed as?

- [2019]  
 A) Internal energy  
 B) Elastic energy  
 C) Heat energy  
 D) Absolute energy



26. What is the factor upon which change in internal energy and ideal depends?

- [2013]  
 A) Change in volume  
 B) Change in volume and temperature  
 C) Change in temperature  
 D) Path followed to change internal energy



And 'W' are the amount of heat supplied to a system energy can be denoted as

- A)  $\frac{Q}{W}$   
B)  $Q \cdot W$   
C)  $\frac{Q}{W}$   
D)  $1 + \frac{Q}{W}$

[2012]

26. In which of the following, the change in internal energy is more?

- A) In system A  
B) in system B  
C) Cannot be predicted  
D) Change is zero in both (both are cyclic)

[2011]

27. The rapid escape of air from a burst tyre is an example of

- A) Adiabatic processes  
B) Isothermal process  
C) Cooling process  
D) First law of thermodynamics

[2016]

28. Which relation exactly described the isothermal process

- A)  $Q=W$   
B)  $W=-\Delta U$   
C)  $Q=-\Delta U$   
D)  $Q=\Delta U + W$

[2016]

29. When the state of gas change without change in temperature, the gas is said to undergo

[2015]

- A) Isothermal process  
B) Adiabatic processes  
C) Isochoric process  
D) Isobaric Process

### Key And Solution

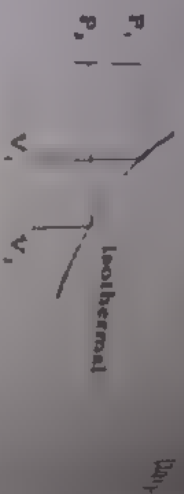
1. Answer: C-Solution: Molecules do not exert force on each other except during a collision

2. Answer: A-Solution: Molecule do not exert force on each other except during collision

3. Answer: B-Solution:  $P = \frac{P}{3} < v^2 \geq \frac{6}{3} \times 500 = 10^3 - Pa$

4. Answer: D-Solution:  $PV=nRT$  for same T and  $P \Rightarrow \frac{V_1}{V_2} = \frac{n_1}{n_2} = \frac{2}{3}$

30. What will be the mathematical form of first law of thermodynamics for a system whose volume by pressure is shown?



- A)  $Q=UW$   
B)  $U=W$   
C)  $Q=U/W$   
D)  $Q=W$

31. First law of thermodynamics under which conditions can be mathematically written as

- A)  $Q=W$   
B)  $Q-\Delta U$   
C)  $Q=U+W$   
D)  $W=-\Delta U$

[2017]

### Molar Specific Heat (H) Gases

32. If  $C_p = \frac{5}{2} R$   $C_v$  will be

- A)  $5/5 R$   
B)  $2/7 R$   
C)  $5/2 R$   
D)  $7/2 R$

[2017]

33. If one mole of an ideal gas is heated at constant pressure, then the first law of thermodynamics can be written as

[2016]

- A)  $C_p \Delta T = C_v \Delta T + P \Delta V$   
B)  $C_v \Delta T = C_p \Delta T + P \Delta T$   
C)  $C_p \Delta T = C_v \Delta T + V \Delta P$   
D)  $\Delta C_p T = \Delta C_v = \Delta C_v T + P \Delta V$

34. The relation between Celsius and Fahrenheit scales is  $\frac{C}{100} = F - \frac{32}{180}$  at what temperature both scales give the same reading?

[2014]

- A)  $-1000^\circ$   
B)  $-40^\circ$   
C)  $-180^\circ$   
D)  $-173^\circ$

5. Answer: A-Solution:  $P = \frac{P}{3} < v^2 > \Rightarrow < v^2 > 2$

6. Answer: B-Solution:  $n = \text{number of moles, } n = \frac{V}{V_m}$

7. Answer: C-Solution:  $P = \frac{\text{mass of gas}}{V} = \frac{m}{V}$

8. Answer: A-Solution:  $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$

9. Answer: A-Solution:  $V_{ms} = \frac{1^2 + 2^2 + 3^2}{3} = \frac{14}{3}$

10. Answer: A-Solution:  $V_{rms} = \sqrt{\frac{3RT}{M}}$  at T = same for both

$$\frac{V_{rms1}}{V_{rms2}} = \sqrt{\frac{M_2}{M_1}} = \sqrt{\frac{1}{4}} = \frac{1}{2} \Rightarrow \text{So } V_{rms1} = \frac{1}{2} V_{rms2}$$

11. Answer: A-Solution:  $V_{rms} = \frac{1}{2} \sqrt{\frac{3RT}{M}}$

12. Answer: C-Solution: collision of gas molecule with the walls of container is perfectly elastic (Kinetic Energy remains constant)

13. Answer: B-Solution:  $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \cdot T_2 = P_2 V_2 \left( \frac{T_1}{P_1 V_1} \right) \text{ so } T_2 = 298K$

14. Answer: A-Solution:  $PV = RT$  for  $n=1$   $T = \frac{PV}{R} = \frac{(25 \times 10^5)(10^{-2})}{8.314} = 300K$

15. Answer: D-Solution:  $PV = nRT$  for ideal gas

16. Answer: B

17. Answer: A-Solution:  $\frac{P_1}{P_2} = \frac{T_1}{T_2} = \frac{2680}{4870} = 273 \cdot \frac{16}{7} \text{ so } T = 496.8K$

18. Answer: D-Solution: At constant temperature pressure is inversely proportional to volume

19. Answer: D-Solution: Here  $T_1 = 27^\circ C = 300K$ ,  $T_2 = 327^\circ C = 600K$

$$T = \frac{2}{3K} < K, E > \Rightarrow \frac{T_1}{T_2} = \frac{< K, E >}{< K, E >} = \frac{x}{x'} = \frac{300}{600} = \frac{1}{2} \Rightarrow x' = 2x$$

20. Answer: D-Solution:  $T = \frac{2}{3K} < K, E > \Rightarrow < K, E > \geq \frac{3KT}{2} = \frac{3(1.38 \times 10^{-23})(290)}{2} = 6 \times 10^{-21}J$

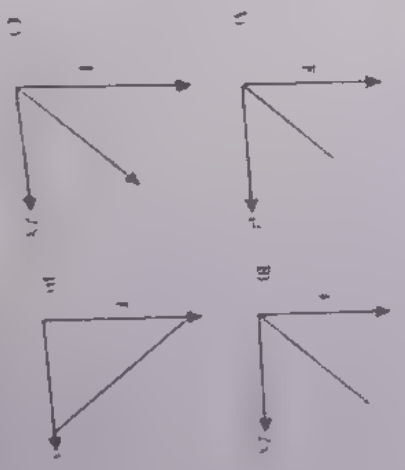
### CNIT 9 Electrostatics

#### Coulombs Law

Coulombs law is given by the formula  $F = k \frac{q_1 q_2}{r^2}$   
 r<sup>2</sup> The Magnitude of having the unit of Nm<sup>2</sup>/C<sup>2</sup> for free space is equal to

- A)  $9 \times 10^7$
- B)  $6 \times 10^7$
- C)  $10 \times 10^9$
- D)  $9 \times 10^9$

A point charge at distance 'x' from another point charge experiences a force of repulsion which one of the following graph shows, How the force is related to 'x'.



21. Answer: B-Solution: Boltzmann constant =  $\frac{3}{2} k$

22. Answer: A-Solution:  $V_{rms} = \sqrt{\frac{3RT}{M}}$  at T = same for both

$$\frac{V_{rms1}}{V_{rms2}} = \sqrt{\frac{M_2}{M_1}} = \sqrt{\frac{1}{4}} = \frac{1}{2} \Rightarrow \text{So } V_{rms1} = \frac{1}{2} V_{rms2}$$

23. Answer: A

24. Answer: C-Solution: change in internal energy is function of state at different temperature

25. Answer: B-Solution:  $Q = \Delta u + W$

26. Answer: B-Solution: In cyclic process, change in internal energy is zero

27. Answer: A-Solution: At rapid process are adiabatic

28. Answer: A-Solution: T = constant,  $\Delta u = 0$   $Q = W$

29. Answer: A-Solution: without changing temperature  $\Delta u = 0 \Rightarrow T = \text{constant}$

30. Answer: D-Solution: At isolated process  $T = \text{constant}$ ,  $\Delta u = 0$  So,  $Q = W$

31. Answer: D-Solution: At adiabatic process  $Q=0$ ,  $Q = \Delta u + W \Rightarrow W = -\Delta u$

32. Answer: D-Solution:  $C_p - C_v = R \Rightarrow C_p = \frac{5}{2} R = R \Rightarrow C_p = \frac{7R}{2}$

33. Answer: A-Solution:  $Q_p = \Delta u + W$  at P = constant  $\Rightarrow C_p \Delta T = C_v \Delta T + P \Delta V$

34. Answer: B-Solution: C: 0, 100, 100, 180, 180, So X = 60, 100 = X = 2, 180 and X = 40

3. Coulombs force between two charges  $q_1 = 2e$  and force is 2N the distance between charge is 3m, what is the distance between charge (Our YouTube Channel)

is the charge of  $q_2$

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- A)  $1 \times 10^6 \text{C}$   
C)  $2 \times 10^6 \text{C}$

[2017]

4. Electric field strength at point between oppositely charged plates is reduced to half, what will be the new value of electric intensity?

- B)  $1 \times 10^6 \text{C}$   
D)  $4 \times 10^6 \text{C}$

- A)  $4E$   
C)  $E/4$

[2019]

5. Force experienced per unit positive test charge at a point in an electric field the definition of:

- B)  $E/2$   
D)  $2E$

- A) Electric potential Energy  
B) Electric Field Strength

[2018]

6. The electric field strength at the position  $r = (4i + 3j) \text{ m}$  caused by a point charge of  $5 \mu\text{C}$  placed at origin is

- D) Electric Field

- A)  $1240i + 1280j \text{ N/C}$   
C)  $1440i + 1080j \text{ N m}$

[2017]

- B)  $1440i - 1080j \text{ V/C}$   
D)  $1240i + 1080j \text{ N/C}$

7. Electric intensity is a vector quantity and its direction is

[2010]

- A) Perpendicular to the direction of field  
B) Opposite to the direction of force  
C) At the certain angle  
D) Along the direction of force

8. The magnitude of an electric field between two separated plates can be calculated by the relation

[2010]

- A)  $\Delta V = E \cdot d$   
C)  $\Delta V = qd$

- B)  $\Delta V = E \cdot d$   
D)  $E = \Delta V$

### Electric Potential

9. Electric field strength of a point charge is  $E$  and electric potential is  $V$  at a distance  $r$  from the point charge. What is the electric potential at a point for the same point charge where electric field strength is  $E/4$ ?

[2019]

- A)  $V/4$   
C)  $V/2$

- B)  $4V$   
D)  $2V$

10. The work done in moving a unit positive charge from one point to another against the electric field is a measure of:

[2019]

- A) Capacitance  
B) Potential difference between two points  
C) Intensity of electric field  
D) Resistance between two points

- A)  $18 \times 10^4 \text{ volt}$   
C)  $1.8 \times 10^4 \text{ volt}$

- B)  $1.8 \times 10^4 \text{ volt}$   
D)  $1.8 \times 10^4 \text{ volt}$

### Capacitance of a capacitor

12. If the length, width and separation between plates of a parallel plate capacitor is doubled, its capacitance becomes

- A) Double  
C) Four time

- B) Half  
D) Eight time

[2016]

13. The distance between the plates of a parallel plate capacitor is  $2.0 \text{ mm}$  and area of each plate is  $25 \text{ m}^2$ . A potential difference of  $1.0 \times 10^4 \text{ V}$  is applied across the plates. Find the capacitance.

- A)  $4 \times 10^4 \text{ F}$   
C)  $8.85 \times 10^{-9} \text{ F}$

- B)  $3.54 \times 10^4 \text{ F}$   
D)  $9.0 \times 10^{-9} \text{ F}$

[2016]

14. What is the charge stored on a  $5 \mu\text{F}$  capacitor charged to the potential difference of  $12 \text{ V}$ ?

[2011]

- A)  $60 \mu\text{C}$   
C)  $2.4 \mu\text{C}$

- B)  $2.4 \text{ C}$   
D)  $60 \text{ C}$

15. What will be the effect on the capacitance of a capacitor if area of each plate is doubled and separation between the plates is halved?

[2012]

- A) Capacitance remains same  
B) Capacitance becomes double  
C) Capacitance becomes four times  
D) Capacitance reduces of half

### Energy Stored In Capacitor

16. A particle carrying charge of  $5e$  falls through a potential difference of  $25 \text{ V}$ . What would be the energy acquired by the particle in joule?

[2011]

- A)  $125 \times 10^{-19} \text{ J}$   
B)  $1.6 \times 10^{-19} \text{ J}$   
C)  $125 \times 1.6 \times 10^{-19} \text{ J}$   
D)  $125 \text{ J}$

17.  $10 \text{ V}$  potential difference is applied across the plates of  $1 \text{ F}$  capacitor. What is the energy stored in capacitor?

[2010]

- A)  $0.5 \text{ mJ}$   
C)  $5 \text{ J}$

- B)  $0.05 \text{ mJ}$   
D)  $50 \text{ J}$

Answer: D

Answer: B

Answer: B

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1

Answer: 1





as if it represented a movement of positive charges is:

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9. An electric charge in uniform motion produces:

- A) Electronic current [2010]
- B) Electric current
- C) Magnetic lines" D) Conventional current

10. Three 6Ω resistors are connected as shown in the diagram.

- A) An electric field
- B) A magnetic field. [2008]
- C) Both magnetic and electric fields
- D) Neither magnetic nor

11. If a resistor having resistance 'R' is cut into three equal parts, then equivalent of parallel combination is:



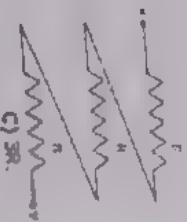
What is the resistance between points 'A' and 'B'? [2016, 2014]

- A) 0Ω
- B) 18Ω
- C) 4Ω.
- D) 2Ω

[2015]

- A)  $\frac{9}{R}$
- B)  $\frac{3}{R}$
- C)  $\frac{R}{9}$
- D)  $\frac{R}{3}$

12. Three resistance each having value 'R' are connected as shown in figure. What is the equivalent resistance between 'X' and 'Y' [2013]



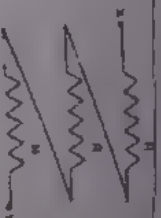
- A) R
- B) R/3
- C) 3R.
- D) R<sup>3</sup>

13. Which combination of seven identical resistors each of 2Ω gives rise to the resultant of 10/11 [2012]

- A) 5 parallel, 2 series
- B) 4 parallel, 3 series
- C) 3 parallel, 4 series
- D) 2 parallel, 5 series

14. Three resistors each having value 'R' are connected as shown in figure. What is the equivalence resistance between 'X' and 'Y'? [2011]

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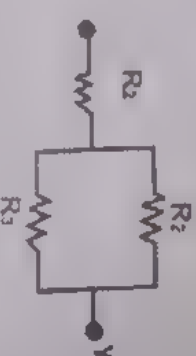
- A) 3R
- B) R
- C) R/3
- D) R/3

15. Two long parallel wires Wire 1 and Wire 2 are each other as shown in the figure. What would be the reasons? [2011]



- A) Both carry current in same direction
- B) Both carry current in opposite direction
- C) Wire 1 has current, but Wire 2 has no current
- D) Wire 2 has current, wire 1 has no current.

16. Three resistors of resistance R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are connected as shown in figure. Equivalent resistance is: [2011]



- A) R<sub>1</sub> + R<sub>2</sub> + R<sub>3</sub>
- B) R<sub>1</sub> + R<sub>2</sub> + R<sub>3</sub> R<sub>2</sub>
- C) R<sub>1</sub> R<sub>2</sub> + R<sub>1</sub> R<sub>3</sub> + R<sub>2</sub> R<sub>3</sub> / (R<sub>1</sub> + R<sub>2</sub> + R<sub>3</sub>)
- D) R<sub>1</sub> R<sub>2</sub> R<sub>3</sub> / (R<sub>1</sub> + R<sub>2</sub> + R<sub>3</sub>)

Electricity And Current

17. The resistance of a piece of wire is 12Ω. It is bent to form an equilateral triangle. What is equivalent resistance between any two corners of the triangles? [2015]

- A) 1.3Ω
- B) 2.0Ω
- C) 4.0Ω
- D) 2.7Ω

Resistance And Resistivity

18. A copper wire has length L and cross-sectional area A. Its resistance is R. If we halved the length and halved the diameter of wire, then what will be the resistance of this wire? [2018]

- A) R
- B) 3R
- C) 2R
- D) 4R

19. If the resistance of each resistor is 10 ohm in the following figure then what will be the effective

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resistance between points 'A' and 'B'.

[2017]



- (a) 40 ohms  
(b) 50 ohms  
(c) 30 ohms  
(d) 10 ohms
12. A 12 volt battery is applied across 632 resistance to give a steady flow of current. What must be the required potential difference across the same resistance to have a steady current of one ampere?

- (a) 12 V  
(b) 3 V  
(c) 6 V  
(d) 1 V

11. Energy consumed by 60 watt bulb in 2 minutes is equal to

- (a) 2 kJ or joules  
(b) 720 joules  
(c) 120 joules  
(d) 2000 joules

10. If 'V' is applied potential difference across a resistance 'R', then loss in potential energy per unit time is:

- (a)  $V^2$   
(b)  $I^2 R$   
(c) R  
(d) All of the above

9. A particle carrying charge of 2e falls through a potential Difference of 3.0 V. Calculate the energy required by it:

- (a)  $9.6 \times 10^{-19}$  J  
(b)  $9.1 \times 10^{18}$  J  
(c)  $1.6 \times 10^{-19}$  J  
(d)  $6.0 \times 10^{-19}$  J

8. The work done in moving a unit positive charge from one point to another against the electric field is a measure of:

- (a) Capacitance  
(b) Potential difference between two points  
(c) Intensity of electric field  
(d) Resistance between two points
7. Which of the following has the highest resistivity?

- (a) Germanium  
(b) Silver  
(c) Copper  
(d) Platinum

Key and Solution

1. Answer: B-Solution:

$$I = \frac{V}{R}, R = \frac{\rho L}{A}, \frac{\rho L}{\pi r^2}$$

$$R = \frac{\rho(2L)}{\pi(2r)^2} = \frac{2\rho L}{4A} = \frac{R}{2}$$

2.

$$I = \frac{V}{R/2} = 2 \frac{V}{R} = 2I$$

3. Answer: A-Solution:

$$I = \frac{2 \times 1.6 \times 10^{-19} \times 10^6}{10^{-3}}$$

$$= 3.2 \times 10^{10} A$$

3.

26. A wire has resistance 100 ohm at 0°C and 200 ohm at 100°C. What is its temperature coefficient?

- (a) 0.01  
(b) 0.25  
(c) 0.01  
(d) 1.25

[2008]

27. Calculate the rate at which energy is transferred by 220 V mains supply which provides a current of 0.1 A to a L.P. g?

- (a) 22 kW  
(b) 2.2 kW  
(c) 22 W  
(d) 2.2 W

[2019]

28. A torch is rated 2.2 V, 0.25 A. Calculate the charge passing through the bulb in one second and the energy transferred by the passage of each coulomb of charge.

- (a) 2.5 C and 0.55 J  
(b) 0.25 C and 2.2 J  
(c) 0.25 C and 2.2 V  
(d) 0.25 C and 0.55 J

[2018]

29. Electrical energy used per second is given by:

- (a) IV  
(b)  $I^2 R$   
(c)  $V^2/R$   
(d) All of these

[2012]

30. The heat produced by a current I in the wire of resistance R during time interval t is?

- (a)  $I^2 R t$   
(b)  $I^2 R$   
(c)  $I R t$   
(d)  $I R^{-1}$

[2008]

Kirchoff's First Law As Conservation Of

Charge

31. The algebraic sum of potential changes in a closed circuit is zero is Kirchoff's \_\_\_\_\_ rule

[2008]

- (a) First  
(b) Second  
(c) Third  
(d) None of these

32. Kirchoff's first law is manifestation of

- (a) Law of conservation momentum  
(b) Law of conservation mass  
(c) Law of conservation of energy  
(d) Law of conservation of charge

[2009, 2012, 2018]

$$I_2 \propto \frac{V_2}{V_1}, \frac{V_2}{V_1} = \frac{I_2}{I_1}$$

$$I_2 = \frac{V_2}{V_1} \times I_1 = \frac{75}{50} \times 2$$

$$I_2 = 3A$$

4. Answer: C-Solution:  $I = \frac{V}{R} = \frac{6+9}{3} = 5A$

5. B-Solution: current flows from positive (high) to negative (low) potential.

6. D-Solution: Current is inversely proportion to resistance

7. Answer: C

8. Answer: D

9. Answer: B-Solution: A charge at rest produce electric field, a charge in a uniform produces magnetic field.

10. Answer: D-Solution:  $R_{eq} = R/n = 6/3 = 2\Omega$

11. Answer: C-Solution:  $R_{eq} = \frac{R}{n}$

$$R = \frac{R}{3}$$

$$R_{eq} = \frac{R}{3 \times 3} \therefore n = 3$$

$$R_{eq} = \frac{R}{9}$$

12. Answer: C

13. Answer: D-Solution:

$$R_{eq} = \frac{10}{11}$$

$$R_e - nR = 2 \times 10 \Omega$$

5 in series remaining in parallel combination

14. Answer: -Solution:  $R_{eq} = nR = 3R$

15. Answer: B

16. Answer:

17. Answer: D-Solution:  $R_{eq}$

$$\left(\frac{n+1}{n^2}\right) R, n = 3$$

$$R = 12$$

$$\text{So } R_{eq} = 2.7 \Omega$$

18. Answer: C-Solution:  $R \propto L/A$  so  $R \propto L/d^2$

19. Answer: D-Solution:

$$R_{eq} = nR = 20 \Omega$$

$$R_{eq} = nR = 20 \Omega$$

$$R_{eq} = \frac{R}{n} = \frac{20}{2} = 10 \Omega$$

20. Answer: D-Solution:

$$\frac{V_2}{V_1} = \frac{I_2 R_2}{I_1 R_1} \therefore I_1 = \frac{V}{R} 2A$$

$$V_2 = \frac{I_2 R_2}{I_1 R_1} \times I_1$$

$$\frac{1 \times 6}{2 \times 6} \times 12 = 6V$$

$$= 6V$$

21. Answer: A-Solution:  $E = I_2$

$$R = Pt$$

$$E = 60 \times 120s = 7200J =$$

$$7.2KJ$$

22. Answer: D

23. Answer: A-Solution:

$$K.e = 3e \times 2V = 6eV$$

$$= 6 \times 6 \times 1.6 \times 10^{-19}$$

$$K.E = 9.6 \times 10^{-19} J$$

24. Answer: B-Solution: difference between two work done per unit charge

25. Answer:

Germanium is a semiconductor.

26. Answer: C-Solution: the help of temperature resistance (a -  $R_1, R_2, R_3$ )

27. Answer: C-Solution:  $P = \frac{V^2}{R} = \frac{(220)^2}{2200} = 22W$

$$R = \frac{V}{I} = \frac{220}{0.1} = 2200 \Omega$$

28. Answer: D-Solution:

$$P - VI \Rightarrow \frac{E}{I} = VI \Rightarrow E = I^2$$

$$VI \times I = 2.2 \times 0.25 \times 1 = 0.55$$

$$V = \frac{E}{q} \Rightarrow q = \frac{E}{V} = \frac{0.55}{2.2} = 0.25C$$

29. Answer: D-Solution

$$P = VI$$

$$P = I^2 R, V = IR$$

$$P = \frac{V^2}{R} \therefore \frac{V}{R} = 1$$

30. Answer: B

31. Answer: B

32. Answer: D-Solution:

Charge entering the system is equal to charge leaving the system

## Unit 11: Electromagnetism

### Force On Current Carrying Conductor in Uniform Magnetic Field

1. If a conductor of length 7 m is placed in a magnetic field strength 0.3 T carrying current 1A, parallel to the field. What will be the force acting on it due to this magnetic field?

- A) 2.1 N  
B) 0N  
C) 3.1 N  
D) 7 N

2. The horizontal component of earth magnetic flux density is  $1.8 \times 10^{-4} T$ . The current in a horizontal cable is 160A, calculate the maximum force per unit length?

[2019]

- A)  $2.88 \times 10^{-4} N/m$   
B)  $2.88 \times 10^{-3} N/m$   
C)  $2.88 \times 10^{-2} N/m$   
D)  $2.88 \times 10^{-1} N/m$

3. Two long, parallel conductors which are first move are arranged 1.0 cm apart. A steady current of 20 A flows in each of the conductor in the same direction. The conductors

[2018]



- A) Remain stationary  
B) Move towards each other

- C) Move away from each other  
D) Move at right angles to each other  
The unit of magnetic flux density is the  $\text{tesla, T}$ ,  
it can also be expressed as

A)  $1 \text{ N}^{-1} \text{ A}^{-1} \text{ m}$   
C)  $1 \text{ N A}^{-1} \text{ m}$   
B)  $1 \text{ N}^{-1} \text{ A}^{-1} \text{ m}$   
D)  $1 \text{ N A}^{-1} \text{ m}^2$  [2018]

5. Electric current is flowing through a straight conductor as shown in figure given below. The direction of magnetic lines of force will be



- A) Anti clockwise  
C) From Bottom to Top  
B) Clockwise  
D) From Top to Bottom  
If we doubled all the parameters of the force acting on current carrying conductor a 90° then magnetic force becomes

A) Half  
C) Eight times  
B) Double  
D) Four times [2016]

7. If is maximum force acting on a conductor. Now if we change the direction of conductor by making an angle of  $45^\circ$  with magnetic field then the force becomes

A)  $F/2$   
C)  $1/\sqrt{2}$   
B)  $2F$   
D)  $\sqrt{2}F$  [2016]

8. The force acting on current carrying conductor will be maximum if the angle bet between magnetic field and conductor is

A)  $0^\circ$   
C)  $90^\circ$   
B)  $30^\circ$   
D)  $60^\circ$  [2015]

9. Magnetic field strength is measured in

A)  $\text{A b m}$   
C)  $\text{W b m}$   
B)  $\text{W b m}$   
D)  $\text{W b}$

10. The force on a current carrying conductor in a uniform magnetic field is given by:

A)  $ILB \cos \alpha$   
C)  $IL \cos \alpha$   
B)  $ILB \sin \alpha$   
D)  $IL \sin \alpha$

11. Due to current in straight conductor the distance between magnetic field lines

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C) Decreases away from conductor  
D) Increases and then decreases towards conductor  
12. A solenoid 15cm between long has 100 turns of wire. 5A current of a flow through it. What is the magnitude of magnetic field inside the solenoid?

A)  $75 \pi \times 10^{-4} \text{ T}$   
C)  $4 \pi \times 10^{-4} \text{ T}$   
B)  $60 \pi \times 10^{-4} \text{ T}$   
D)  $750 \pi \times 10^{-4} \text{ T}$  [2014]

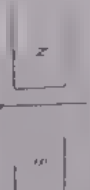
13. A long straight current carrying conductor has current direction from bottom to top when held vertically. What will be the direction of magnetic field lines when observed from below the conductor?

A) Clockwise  
C) Anti clockwise  
B) Vertically upward  
D) Vertically downward [2013]

14. A solenoid is cut into two halves. magnetic induction due to same current in each half will be

A) Half of the original  
C) Same as original  
B) Double of the original  
D) Four times of the original [2013]

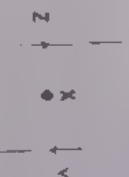
15. The diagram shows a wire, carrying a current 'I', placed between the poles of a magnet:



- In which direction does the force on the wire act?

A) Towards the 'N' pole of the magnet  
C) Upwards  
B) Downwards  
D) Downwards

16. Two long straight parallel wires held vertically, have equal but opposite currents as shown in the figure



- Which of the following effect will be observed?  
A) Magnetic field at 'X' is stronger than that at 'Y' and 'Z'  
B) Magnetic field at 'Y' and 'Z' are same  
C) Magnetic field at 'X' is weaker than that at 'Z'  
D) Magnetic field at 'X' is weaker than that at 'Z'



17. If 10 cm solenoid has 100 turns what will be the magnetic field inside along its axis if one micro ampere current passes

- A)  $4\pi \times 10^{-5}$  tesla  
B)  $4\pi \times 10^{-4}$  tesla  
C)  $4\pi \times 10^{-3}$  tesla  
D)  $4\pi \times 10^{-2}$  tesla

[2012]

18. If the number of turns of a solenoid circular coil is doubled, but the current in the coil and Radius of the coil remains same, then what will be the magnetic flux density produced by it coil?

- A) Magnetic flux density will be halved  
B) Magnetic flux density increases by different amount at different points  
C) Magnetic flux density remains unchanged  
D) Magnetic flux density will be doubled

[2011]

19. To long parallel wires Wire 1 and Wire 2 repel each other as shown in the figure. What could be the reasons?

[2011]

- A) Both carry current in same direction  
B) Both carry current in opposite direction  
C) Wire 1 has current, but Wire 2 has no current  
D) Wire 2 has current, wire 1 has no current

20. The diagram shows a wire, carrying a current 'I', placed the poles of a magnet. In which direction does the force on the wire act?

[2011]



B) Downwards

- A) Upwards  
C) Towards the 'S' pole of the magnet  
D) Towards the 'N' pole of the magnet

21. Which one of the following relations is correct?

[2010]

Key and Solution

1. B-Solution: for parallel direction  $\theta = 0^\circ$

2. Answer: A-Solution:  $B = 1.8 \times 10^{-4} T$

3. Answer: A-Solution:  $B = 1.8 \times 10^{-4} T$

$$\frac{F_{max}}{L} = ?$$

$$\frac{F_{max}}{L} = IB$$

$$= (160)(1.8 \times 10^{-4})$$

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- A)  $1 \text{ wb m}^{-2} = 1 \text{ N m}^{-2} \text{ A}^{-1}$   
B)  $1 \text{ Tesla} = 10^4 \text{ Gauss}$   
C)  $1 \text{ wb m}^{-2} = 1 \text{ tesla}$   
D) All of these

22. The value of permeability of free space  $\mu_0$  is

- A)  $4\pi \times 10^{-7} \text{ Wb/A m}$   
B)  $4\pi \times 10^{-7} \text{ Wb/A m}$   
C)  $4\pi \times 10^{-7} \text{ Wb/A m}$   
D)  $4\pi \times 10^{-7} \text{ Wb/A m}$

23. The net magnetic field created by the electron within an atom is due to the field created by its motion.

- A) Orbital  
B) Spin  
C) Orbital & spin.  
D) Orbital & spin

[2009]

24. Force experienced by a moving charge in a magnetic field is:

- A)  $F = BA \cos \theta$   
B)  $F = \mu_0 NI$   
C)  $F = q(v \times B)$   
D)  $F = I(L \times B)$

25. A neutron having mass equal to a proton ( $m_p = 1.6 \times 10^{-27} \text{ kg}$ ) is moving in a magnetic field in which  $1.20 \times 10^{-1} \text{ T}$  with a speed of  $2.0 \times 10^7 \text{ ms}^{-1}$  what is the Maximum force experienced by the neutron.

[2019]

- A)  $3.84 \times 10^{15}$   
B) 0  
C)  $3.84 \times 10^{15} \text{ N}$   
D)  $38.4 \times 10^{15} \text{ N}$

26. A charge is projected with velocity of  $10 \text{ m/s}$  in a magnetic field of  $10 \text{ T}$  at angle of  $60^\circ$ . If force of  $2.78 \times 10^{-17} \text{ N}$  is exerted on the charge then value of charge will be

[2017]

- A)  $1.60 \times 10^{19} \text{ C}$   
B)  $2.70 \times 10^{19} \text{ C}$   
C)  $4.80 \times 10^{19} \text{ C}$   
D)  $3.20 \times 10^{19} \text{ C}$

E/M Of An Electron

27. e/m of an electron is given by the relationship.

[2018]

- A)  $e/m = 2V/B^2 r^2$   
B)  $e/m = (V/B)^2$   
C)  $e/m = V/rB$   
D)  $e/m = VB/r$

$$\frac{F_{max}}{L} = 2.88 \times 10^{-4} \text{ N/m}$$

3. Answer: B-Solution: when current flows in same direction in the wires, they attract each other

$$F = ILB \sin \theta$$

4. Answer: D-Solution: as  $B = \frac{\mu_0}{4\pi} \frac{I}{r}$

5. Answer: B-Solution: use conventional current right hand rule.

14. & All Series

Answer: C-Solution: as  $F = ILB \sin \theta$

$L = 2L$   $I' = 2I$   $B' = 2B$

$F = I' L' B' \sin \theta$

$F = (2I) (2L) (2B) \sin 90$

$F' = 8F$

Answer: C-Solution: If  $\theta = 45^\circ$

then  $F' = ?$

$F' = ILB \sin \theta$

$F' = ILB \sin(45^\circ)$

$V =$

$\cos(45^\circ) = \frac{1}{\sqrt{2}}$

$F = ILB \times \frac{1}{\sqrt{2}}$

$V = \frac{F}{\sqrt{2}}$

Answer: C-Solution:

$F' = ILB \sin \theta$

For  $\rightarrow$  Maximum

$\theta = 90^\circ$

1. Answer: B-Solution: Mag field strength  $= \frac{\phi}{A} = \frac{WB}{\pi r^2}$

11. Answer: B-Solution:  $F = ILB \sin \theta$

12. Answer: A-Solution: as  $B = \frac{\mu_0 I}{2\pi r} \Rightarrow B \propto \frac{1}{r}$

12. Answer: C-Solution:  $I = 15 \text{ cm} = 15 \times 10^{-2} \text{ m}$

$I = 5A$

$\beta = ?$

$B = \mu_0 n I \therefore n = \frac{N}{L}$

$\beta = 4\pi \times 10^{-7} \times \frac{300}{15 \times 10^{-2}} \times 5$

$\beta = 4\pi \times 10^{-4} T$

13. Answer: A-Solution: By right hand rule magnetic field lines will be in counter clock wise direction

when view from above but when view from below of conductor magnetic field lines will be in clockwise direction

14. Answer: C-Solution:  $B = \mu_0 n I$

Magnetic induction doesn't depend on part of solenoid. When it is cut into two halves then  $n =$

$\frac{n}{2} = \frac{N}{2L} = \frac{N}{L}$  REMAINS constant

15. Answer: B-Solution: As  $F = I(\vec{L} \times \vec{B})$

In the direction of current by using RHR force will be downward direction

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16. Answer: A-Solution: magnetic field at 'X' is larger than that at 'Y' & 'Z' because at 'X' two fields reinforce each other by RHR

17. Answer: B-Solution:  $L = 1 \text{ cm} = 10 \times 10^{-2} \text{ m}$

$I = 1 \text{ A}$   $L = 10^{-2} \text{ m}$

$B = \mu_0 n I = \mu \cdot \frac{N}{L} I$

$B = 4\pi \times 10^{-7} \times \frac{100}{10 \times 10^{-2}} \times 10^{-4}$

18. Answer: D-Solution:  $\tau = 2\pi$

$\beta = ?$

$\beta = \mu_0 n I$

$\beta = \mu_0 n I$

$\beta = U(2nI)$

$\beta = 2I' n I$

$\beta = 2\beta$

19. Answer: B-Solution: when two wires parallel to each other carry current in opposite direction they repel each other

20. Answer: B

21. Answer: D

22. Answer: A-Solution:  $U_0 = 4\pi \times 10^{-7} \text{ WbA}^{-1} \text{m}^{-1}$

23. Answer: C-Solution: Electrons in atom has two motion One is along a circular path revolving around the nucleus called orbital motion and one is around its own axis called spin motion

Net magnetic field is due to both spin and orbital motion.

24. Answer: C-Solution: Force on a moving charge in a magnetic field is

25. Answer: B-Solution: as  $qvB \sin \theta$

For a neutron  $q = 0$

26. Answer: B-Solution:  $F = qvB \sin \theta$

$F = qvB \sin \theta$

$\frac{F}{vB \sin \theta} = q$

$\frac{2.78 \times 10^{-17}}{10 \times 10^{-2} \times \sqrt{3}/2} = q$

27. Answer: A-Solution:  $\frac{e}{m} = 2 \left( \frac{V}{h^2 \lambda^2} \right)$

UNIT 12: ELECTROMAGNETIC INDUCTION

Magnetic Flux

- If the value of magnetic flux is  $10 \text{ Wb}$ , when magnetic lines of force containing magnetic field

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strength of 1T esla passing through unit area of  $10\text{m}^2$  then the angle between magnetic field unit area is:

- A)  $180^\circ$  [2017]  
B)  $360^\circ$   
C)  $90^\circ$   
D)  $0^\circ$

2. The magnetic flux linked with a solenoid of area 'A', having 'N' turns and right angle to field 'B' is

- A) BA [2017]  
B)  $1/2 NBA$   
C) NBA  
D)  $3/4 NBA$

3. The magnetic field in a certain region is given by  $B = (40i - 18k) \text{ Wbm}^2$ . How much flux passes through a  $5.0\text{m}^2$  area loop in this region if the loop lies flat in the xy plane?

- A)  $250 \times 10^{-4} \text{ Wb}$  [2012]  
B)  $90 \times 10^{-4} \text{ Wb}$   
C)  $141 \times 10^{-4} \text{ Wb}$   
D)  $100 \times 10^{-4} \text{ Wb}$

### Faradays Law And Lenz Law

4. If we change the magnetic flux linking a coil by rotating the coil in a constant magnetic field the rate of change of this flux is:

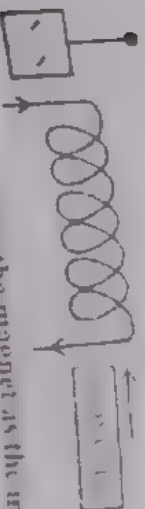
[2019]

- A) Proportional to the coil produced EMF  
B) proportional to the change in produced field  
C) Proportional to the sine of the angle of rotation  
D) Proportional to the rate of change of angle  
Lenz's law in electromagnetic induction is the direct consequence of the principle conservation of

[2018]

- A) Energy  
B) Mass  
C) Momentum  
D) None of these  
The diagram shows a small magnet hanging on a thread near the end of a solenoid carrying a steady current "I".

[2012]



What happens to the magnet as the iron core is inserted into the solenoid?

- A) It moves towards the solenoid  
B) It moves away from solenoid  
C) It moves away from solenoid and rotates through  $180^\circ$   
D) It moves away from solenoid and rotates through  $180^\circ$   
The Lenz's law refers to induced

[2008]

[3] Resistance

A) emf

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C) Short Induced EMF and Induced Current

8. A metal rod of length  $10.0 \text{ cm}$  is moving at a speed of  $0.5 \text{ m/s}$  in a direction perpendicular to a uniform magnetic field. Find emf produced in the rod.

- A)  $2.0 \times 10^{-4} \text{ V}$  [2019]  
B)  $6.50 \times 10^{-4} \text{ V}$   
C)  $1.0 \times 10^{-4} \text{ V}$   
D)  $1.0 \times 10^{-5} \text{ V}$

9. A loop of 5 turns of wire is placed in uniform magnetic field of  $0.51$ . Then area of loop shrinks at constant rate  $10 \text{ m}^2/\text{s}$ . Emf induced in the loop is

- A)  $2.5 \text{ V}$  [2017]  
B)  $2.5 \text{ V}$   
C)  $250 \text{ V}$   
D)  $0.25 \text{ V}$

10. If a rod is dragged perpendicularly through magnetic field of  $0.251$  with velocity  $0.5 \text{ m/s}$ , and length of the rod is  $25 \text{ cm}$ , then emf induced in the rod will be:

[2014]

- A)  $3.12 \times 10^{-3} \text{ V}$   
B)  $50 \times 10^{-3} \text{ V}$   
C)  $5.5 \times 10^{-3} \text{ V}$   
D)  $6 \times 10^{-3} \text{ V}$

### Alternating Current And Time V V sin wt

11. The phase at negative peak of AC voltage is

[2017]

- A)  $0$   
B)  $\pi$   
C)  $\pi/2$   
D)  $3\pi/2$

12. An alternating voltage  $V$  (in volts) is represented by the equation,  $V = 300 \sin (100 \pi t)$  what is the value of "P" for this voltage?

[2015]

- A)  $200 \text{ Hz}$   
B)  $200 \text{ Hz}$   
C)  $100 \text{ Hz}$   
D)  $100 \text{ Hz}$

### Transformer

13. If we give a direct current to the transformer's primary coil, then there will be:

[2018]

- A) less emf produced in the secondary  
B) no emf produced in the secondary  
C) equal emf produced in the secondary  
D) more emf produced in the secondary  
14. In a practical transformer mutual induction between primary and secondary coils takes place such transformer what can be deduced about the power

[2018]

- A) Power output = power input  
B) Power output > power input  
C) Power output < power input  
D) Power output < power input

12. In a step-down transformer the output current

- A) is reduced  
B) is increased  
C) remains same  
D) None of these

(12008)

Key And Solution

Answer: D Solution:  $\phi B/M$  is constant

$$\frac{1}{N} \times \frac{1}{l} = \frac{1}{N'} \times \frac{1}{l'}$$

$$N' = N \frac{l}{l'} = N \frac{1}{1} = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

$$N' = N$$

## UNIT 13: DEFORMATION OF SOLIDS

Stress, Strain And Young's Modulus

1. A 1.25cm diameter cylinder is subjected to a load of 2500kg. Calculate the stress on bar. [2017]

$$A) 2 \times 10^8 \text{ Pa}$$

$$B) 2 \times 10^7 \text{ Pa}$$

$$C) 2 \times 10^6 \text{ Pa}$$

$$D) 2 \times 10^5 \text{ Pa}$$

$$E) 2 \times 10^4 \text{ Pa}$$

$$F) 2 \times 10^3 \text{ Pa}$$

$$G) 2 \times 10^2 \text{ Pa}$$

$$H) 2 \times 10^1 \text{ Pa}$$

$$I) 2 \times 10^0 \text{ Pa}$$

$$J) 2 \times 10^{-1} \text{ Pa}$$

$$K) 2 \times 10^{-2} \text{ Pa}$$

$$L) 2 \times 10^{-3} \text{ Pa}$$

$$M) 2 \times 10^{-4} \text{ Pa}$$

$$N) 2 \times 10^{-5} \text{ Pa}$$

$$O) 2 \times 10^{-6} \text{ Pa}$$

$$P) 2 \times 10^{-7} \text{ Pa}$$

$$Q) 2 \times 10^{-8} \text{ Pa}$$

$$R) 2 \times 10^{-9} \text{ Pa}$$

$$S) 2 \times 10^{-10} \text{ Pa}$$

$$T) 2 \times 10^{-11} \text{ Pa}$$

$$U) 2 \times 10^{-12} \text{ Pa}$$

$$V) 2 \times 10^{-13} \text{ Pa}$$

$$W) 2 \times 10^{-14} \text{ Pa}$$

$$X) 2 \times 10^{-15} \text{ Pa}$$

$$Y) 2 \times 10^{-16} \text{ Pa}$$

$$Z) 2 \times 10^{-17} \text{ Pa}$$

$$AA) 2 \times 10^{-18} \text{ Pa}$$

$$AB) 2 \times 10^{-19} \text{ Pa}$$

$$AC) 2 \times 10^{-20} \text{ Pa}$$

$$AD) 2 \times 10^{-21} \text{ Pa}$$

$$AE) 2 \times 10^{-22} \text{ Pa}$$

$$AF) 2 \times 10^{-23} \text{ Pa}$$

$$AG) 2 \times 10^{-24} \text{ Pa}$$

$$AH) 2 \times 10^{-25} \text{ Pa}$$

$$AI) 2 \times 10^{-26} \text{ Pa}$$

$$AJ) 2 \times 10^{-27} \text{ Pa}$$

$$AK) 2 \times 10^{-28} \text{ Pa}$$

$$AL) 2 \times 10^{-29} \text{ Pa}$$

$$AM) 2 \times 10^{-30} \text{ Pa}$$

$$AN) 2 \times 10^{-31} \text{ Pa}$$

$$AO) 2 \times 10^{-32} \text{ Pa}$$

$$AP) 2 \times 10^{-33} \text{ Pa}$$

$$AQ) 2 \times 10^{-34} \text{ Pa}$$

$$AR) 2 \times 10^{-35} \text{ Pa}$$

$$AS) 2 \times 10^{-36} \text{ Pa}$$

$$AT) 2 \times 10^{-37} \text{ Pa}$$

$$AU) 2 \times 10^{-38} \text{ Pa}$$

$$AV) 2 \times 10^{-39} \text{ Pa}$$

$$AW) 2 \times 10^{-40} \text{ Pa}$$

$$AX) 2 \times 10^{-41} \text{ Pa}$$

$$AY) 2 \times 10^{-42} \text{ Pa}$$

$$AZ) 2 \times 10^{-43} \text{ Pa}$$

$$BA) 2 \times 10^{-44} \text{ Pa}$$

$$BB) 2 \times 10^{-45} \text{ Pa}$$

$$BC) 2 \times 10^{-46} \text{ Pa}$$

$$BD) 2 \times 10^{-47} \text{ Pa}$$

$$BE) 2 \times 10^{-48} \text{ Pa}$$

$$BF) 2 \times 10^{-49} \text{ Pa}$$

$$BG) 2 \times 10^{-50} \text{ Pa}$$

$$BH) 2 \times 10^{-51} \text{ Pa}$$

$$BI) 2 \times 10^{-52} \text{ Pa}$$

$$BJ) 2 \times 10^{-53} \text{ Pa}$$

$$BK) 2 \times 10^{-54} \text{ Pa}$$

$$BL) 2 \times 10^{-55} \text{ Pa}$$

$$BM) 2 \times 10^{-56} \text{ Pa}$$

$$BN) 2 \times 10^{-57} \text{ Pa}$$

$$BO) 2 \times 10^{-58} \text{ Pa}$$

$$BP) 2 \times 10^{-59} \text{ Pa}$$

$$BQ) 2 \times 10^{-60} \text{ Pa}$$

$$BR) 2 \times 10^{-61} \text{ Pa}$$

$$BS) 2 \times 10^{-62} \text{ Pa}$$

$$BT) 2 \times 10^{-63} \text{ Pa}$$

$$BU) 2 \times 10^{-64} \text{ Pa}$$

$$BV) 2 \times 10^{-65} \text{ Pa}$$

$$BW) 2 \times 10^{-66} \text{ Pa}$$

$$BX) 2 \times 10^{-67} \text{ Pa}$$

$$BY) 2 \times 10^{-68} \text{ Pa}$$

$$BZ) 2 \times 10^{-69} \text{ Pa}$$

$$CA) 2 \times 10^{-70} \text{ Pa}$$

$$CB) 2 \times 10^{-71} \text{ Pa}$$

$$CC) 2 \times 10^{-72} \text{ Pa}$$

$$CD) 2 \times 10^{-73} \text{ Pa}$$

$$CE) 2 \times 10^{-74} \text{ Pa}$$

$$CF) 2 \times 10^{-75} \text{ Pa}$$

$$CG) 2 \times 10^{-76} \text{ Pa}$$

$$CH) 2 \times 10^{-77} \text{ Pa}$$

$$CI) 2 \times 10^{-78} \text{ Pa}$$

$$CJ) 2 \times 10^{-79} \text{ Pa}$$

$$CK) 2 \times 10^{-80} \text{ Pa}$$

$$CL) 2 \times 10^{-81} \text{ Pa}$$

$$CM) 2 \times 10^{-82} \text{ Pa}$$

$$CN) 2 \times 10^{-83} \text{ Pa}$$

$$CO) 2 \times 10^{-84} \text{ Pa}$$

$$CP) 2 \times 10^{-85} \text{ Pa}$$

$$CQ) 2 \times 10^{-86} \text{ Pa}$$

$$CR) 2 \times 10^{-87} \text{ Pa}$$

$$CS) 2 \times 10^{-88} \text{ Pa}$$

$$CT) 2 \times 10^{-89} \text{ Pa}$$

$$CU) 2 \times 10^{-90} \text{ Pa}$$

$$CV) 2 \times 10^{-91} \text{ Pa}$$

$$CW) 2 \times 10^{-92} \text{ Pa}$$

$$CX) 2 \times 10^{-93} \text{ Pa}$$

$$CY) 2 \times 10^{-94} \text{ Pa}$$

$$CZ) 2 \times 10^{-95} \text{ Pa}$$

$$DA) 2 \times 10^{-96} \text{ Pa}$$

$$DB) 2 \times 10^{-97} \text{ Pa}$$

$$DC) 2 \times 10^{-98} \text{ Pa}$$

$$DD) 2 \times 10^{-99} \text{ Pa}$$

$$DE) 2 \times 10^{-100} \text{ Pa}$$

$$DF) 2 \times 10^{-101} \text{ Pa}$$

$$DG) 2 \times 10^{-102} \text{ Pa}$$

$$DH) 2 \times 10^{-103} \text{ Pa}$$

$$DI) 2 \times 10^{-104} \text{ Pa}$$

$$DJ) 2 \times 10^{-105} \text{ Pa}$$

$$DK) 2 \times 10^{-106} \text{ Pa}$$

$$DL) 2 \times 10^{-107} \text{ Pa}$$

$$DM) 2 \times 10^{-108} \text{ Pa}$$

$$DN) 2 \times 10^{-109} \text{ Pa}$$

$$DO) 2 \times 10^{-110} \text{ Pa}$$

$$DP) 2 \times 10^{-111} \text{ Pa}$$

$$DQ) 2 \times 10^{-112} \text{ Pa}$$

$$DR) 2 \times 10^{-113} \text{ Pa}$$

$$DS) 2 \times 10^{-114} \text{ Pa}$$

$$DT) 2 \times 10^{-115} \text{ Pa}$$

$$DU) 2 \times 10^{-116} \text{ Pa}$$

$$DV) 2 \times 10^{-117} \text{ Pa}$$

$$DW) 2 \times 10^{-118} \text{ Pa}$$

$$DX) 2 \times 10^{-119} \text{ Pa}$$

$$DY) 2 \times 10^{-120} \text{ Pa}$$

$$DZ) 2 \times 10^{-121} \text{ Pa}$$

$$EA) 2 \times 10^{-122} \text{ Pa}$$

$$EB) 2 \times 10^{-123} \text{ Pa}$$

$$EC) 2 \times 10^{-124} \text{ Pa}$$

$$ED) 2 \times 10^{-125} \text{ Pa}$$

$$EE) 2 \times 10^{-126} \text{ Pa}$$

$$EF) 2 \times 10^{-127} \text{ Pa}$$

$$EG) 2 \times 10^{-128} \text{ Pa}$$

$$EH) 2 \times 10^{-129} \text{ Pa}$$

$$EI) 2 \times 10^{-130} \text{ Pa}$$

$$EJ) 2 \times 10^{-131} \text{ Pa}$$

$$EK) 2 \times 10^{-132} \text{ Pa}$$

$$EL) 2 \times 10^{-133} \text{ Pa}$$

$$EM) 2 \times 10^{-134} \text{ Pa}$$

$$EN) 2 \times 10^{-135} \text{ Pa}$$

$$EO) 2 \times 10^{-136} \text{ Pa}$$

$$EP) 2 \times 10^{-137} \text{ Pa}$$

$$EQ) 2 \times 10^{-138} \text{ Pa}$$

$$ER) 2 \times 10^{-139} \text{ Pa}$$

$$ES) 2 \times 10^{-140} \text{ Pa}$$

$$ET) 2 \times 10^{-141} \text{ Pa}$$

$$EU) 2 \times 10^{-142} \text{ Pa}$$

$$EV) 2 \times 10^{-143} \text{ Pa}$$

$$EW) 2 \times 10^{-144} \text{ Pa}$$

$$EX) 2 \times 10^{-145} \text{ Pa}$$

$$EY) 2 \times 10^{-146} \text{ Pa}$$

$$EZ) 2 \times 10^{-147} \text{ Pa}$$

$$FA) 2 \times 10^{-148} \text{ Pa}$$

$$FB) 2 \times 10^{-149} \text{ Pa}$$

$$FC) 2 \times 10^{-150} \text{ Pa}$$

$$FD) 2 \times 10^{-151} \text{ Pa}$$

$$FE) 2 \times 10^{-152} \text{ Pa}$$

$$FF) 2 \times 10^{-153} \text{ Pa}$$

$$FG) 2 \times 10^{-154} \text{ Pa}$$

$$FH) 2 \times 10^{-155} \text{ Pa}$$

$$FI) 2 \times 10^{-156} \text{ Pa}$$

$$FJ) 2 \times 10^{-157} \text{ Pa}$$

$$FK) 2 \times 10^{-158} \text{ Pa}$$

$$FL) 2 \times 10^{-159} \text{ Pa}$$

$$FM) 2 \times 10^{-160} \text{ Pa}$$

$$FN) 2 \times 10^{-161} \text{ Pa}$$

$$FO) 2 \times 10^{-162} \text{ Pa}$$

$$FP) 2 \times 10^{-163} \text{ Pa}$$

$$FQ) 2 \times 10^{-164} \text{ Pa}$$

$$FR) 2 \times 10^{-165} \text{ Pa}$$

$$FS) 2 \times 10^{-166} \text{ Pa}$$

$$FT) 2 \times 10^{-167} \text{ Pa}$$

$$FU) 2 \times 10^{-168} \text{ Pa}$$

$$FV) 2 \times 10^{-169} \text{ Pa}$$

$$FW) 2 \times 10^{-170} \text{ Pa}$$

$$FX) 2 \times 10^{-171} \text{ Pa}$$

$$FY) 2 \times 10^{-172} \text{ Pa}$$

$$FZ) 2 \times 10^{-173} \text{ Pa}$$

$$GA) 2 \times 10^{-174} \text{ Pa}$$

$$GB) 2 \times 10^{-175} \text{ Pa}$$

$$GC) 2 \times 10^{-176} \text{ Pa}$$

$$GD) 2 \times 10^{-177} \text{ Pa}$$

$$GE) 2 \times 10^{-178$$



15. In a step-down transformer the output current [2008]  
 A) Is reduced  
 B) Is increased  
 C) Remains same  
 D) None of these

**Key And Solution**

1. Answer: D-Solution:  $\phi B A \cos \theta$

$$1 = \frac{10}{1 \times 10} = \cos \theta$$

$$\theta = \cos^{-1}(1) = 0$$

$$\theta = 0$$

2. Answer: C-Solution:  $\phi = NBA$

3. Answer: B-Solution:  $\theta = \vec{B} \cdot \vec{A}$

$$\text{As } \vec{B} = 40\hat{i} - 18\hat{j}$$

$$\theta = (40\hat{i} - 18\hat{j}) \cdot (5 \times 10^{-4}\hat{k})$$

$$\theta = 90 \times 10^{-4} \text{ wb}$$

4. Answer: A-Solution:  $\epsilon = -N \frac{\Delta \phi}{\Delta t}$

$$\epsilon \propto \frac{\Delta \phi}{\Delta t}$$

N = Constant

5. Answer: A-Solution: Law of conservation of energy holds because mechanical energy is converted into electrical energy

6. Answer: C-Solution: By using RHR when current is passing through solenoid it make its north and South

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Pole and manner. It moves towards the solenoid. By inserting the iron core into the end, inside magnetic field of solenoid increase

7. Answer: A-Solution:  $\epsilon = -\frac{d\phi}{dt}$  refers to induced emf

8. Answer: C-Solution:  $\epsilon = \frac{d\phi}{dt} = \frac{B \cdot A}{dt} = \frac{10^{-4} \times 10^{-2}}{10^{-3}} = 10^{-3} \text{ V}$

9. Answer: A-Solution: As  $\epsilon = \frac{N \Delta \phi}{\Delta t} = 5 \times 0.5 \times 10^{-4} = 2.5 \times 10^{-4} \text{ V}$

$$\epsilon = vBL$$

$$\omega = 2\pi f = 100\pi$$

10. Answer: A-Solution:  $\epsilon = vBL$

$$\epsilon = \frac{5}{10} \times \frac{25}{100} \times \frac{25}{100} = 3.2 \times 10^{-2} \text{ V}$$

11. Answer: D-Solution: at  $\frac{\pi}{2}$  Phase is positive  
 at  $\frac{3\pi}{2}$  Phase is negative

at  $0, \pi, 2\pi$  Phase is zero

12. Answer: C-Solution:  $f = 50 \text{ Hz}$

13. Answer: B-Solution: As transformer does not act on direct current, so no emf produced in the secondary.

14. Answer: D-Solution:  $P_m = P_{out}$  (Ideal transformer)  
 $P_{out} < P_m$  (real transformer)

15. Answer: B-Solution: By definition of step down transformer, output current is increased

**UNIT 13: DEFORMATION OF SOLIDS**

**Stress, Strain And Young's Module**

1. A 1.25cm diameter cylinder is subjected to a load of 2500Kg. Calculate the stress on bar: [2017]

$$A) 2 \times 10^8 \text{ Pa}$$

$$C) 2 \times 10^9 \text{ Pa}$$

$$B) 200 \text{ Pa}$$

$$D) 2 \times 10^6 \text{ Pa}$$

2. The ratio of applied stress to the volumetric strain is called [2017]

A) Bulk modulus

C) Tensile modulus

B) Shear modulus

D) Young's modulus

3. A wire of area of cross-section 'A' and original length 'L' is subjected to a load 'F'. A second wire same material with an area is '2A' and length '2L' is subjected to the same load 'F'. If the extension first wire is 'X' and second wire is 'Y' find the ratio 'X/Y'. [2017]

$$A) \frac{1}{4}$$

$$C) \frac{1}{1}$$

$$B) \frac{1}{2}$$

$$D) 2$$

4. Which feature of the following graph represents Young's Modulus? [2015]

A) Area under graph

B) Gradient of the graph

C) Reciprocal of the gradient

D) Product of gradient area of the curve

5. A 4.0 m long wire is subjected to stretching force and its length increase by 40cm. The percent elongation which the wire undergoes is [2013]

A) 10%

C) 100%

B) 40 10%

D) 20 10%

Tensile Stress And Strain

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Ratio of tensile stress and the tensile strain is called:

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7. A wire of length 2m is attached with a mass of 2kg vertically. If tensile strain in the wire is  $0.3 \times 10^{-3}$  then extension in wire will be
- A) 1.5mm  
B) 2.0mm  
C) 0.6mm  
D) 0.15mm
8. In the case of linear deformation, the ratio of tensile stress to tensile strain is called
- A) energy stored in a stretched  
B) young's double slit phenomenon  
C) Bulk modulus  
D) Young's modulus

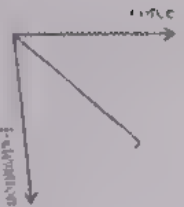
9. The wire made of copper belongs to which specific kind of material?

A) Ductile material  
B) Tough material  
C) Brittle material  
D) Deformed material

10. Which material will follow the below stress-strain curve?

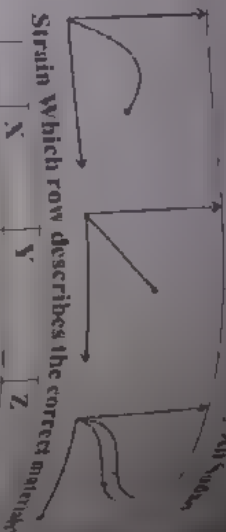
A) Copper  
B) Iron  
C) Lead  
D) Glass

11. Three graphs for three types of materials are shown in the figure.



12. The stress-strain graph, deduced the following limits reach successively

A) Proportional limit, elastic limit, yield limit  
B) Proportional limit, yield limit, elastic limit  
C) Yield limit, elastic limit, proportional limit  
D) Elastic limit, proportional limit, yield limit



13. The area under the extension-load graph of an elastic material whose elastic limit has not been exceeded gives its:

A) Stress  
B) strain energy  
C) Young modulus  
D) strain

14. Strain energy in a deformed material is stored in the form of:

A) Elastic energy  
B) Plastic energy  
C) Potential energy  
D) Kinetic energy

15. A wire has spring constant of  $5 \times 10^4 \text{ Nm}^{-1}$ . It is stretched by a force to extension of 1.4 mm. Calculate the strain energy stored in the wire.

A)  $4.9 \times 10^{-5} \text{ J}$   
B)  $4.9 \text{ J}$   
C)  $4.9 \times 10^{-5} \text{ J}$   
D)  $4.9 \times 10^3 \text{ J}$

16. A wire is stretched by a force 'F' which causes an extension  $\Delta x$ , the energy stored in the wire is:

A)  $F\Delta x$   
B)  $2F\Delta x$   
C)  $\frac{1}{2}F\Delta x$   
D)  $\frac{1}{2}F\Delta x$

### Key And Solution of Deformation of solids,

1. Answer: A-Solution: Stress =  $\frac{F}{A}$

2. Answer: A-Solution:

3. Answer: C-Solution:

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$$\frac{\Delta L}{\Delta L} = \frac{F_x}{F_y} \times \frac{L_x}{L_y} \times \frac{A_y}{A_x} \times \frac{Y_x}{Y_y}$$

Material and load are same so  $Y$  and  $L$  are same

$$\frac{\Delta L_x}{\Delta L_y} = \frac{F_x}{F_y} \times \frac{L_x}{L_y} \times \frac{A_y}{A_x} \times \frac{Y_x}{Y_y}$$

$$\frac{\Delta L_x}{\Delta L_y} = \frac{F_x}{F_y} \times \frac{L_x}{L_y} \times \frac{A_y}{A_x} \times \frac{Y_x}{Y_y}$$

$$\frac{\Delta L_x}{\Delta L_y} = \frac{F_x}{F_y} \times \frac{L_x}{L_y} \times \frac{A_y}{A_x} \times \frac{Y_x}{Y_y}$$

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$$\frac{\Delta L_x}{\Delta L_y} = \frac{F_x}{F_y} \times \frac{L_x}{L_y} \times \frac{A_y}{A_x} \times \frac{Y_x}{Y_y}$$

$$\frac{\Delta L_x}{\Delta L_y} = \frac{F_x}{F_y} \times \frac{L_x}{L_y} \times \frac{A_y}{A_x} \times \frac{Y_x}{Y_y}$$

$$\frac{\Delta L_x}{\Delta L_y} = \frac{F_x}{F_y} \times \frac{L_x}{L_y} \times \frac{A_y}{A_x} \times \frac{Y_x}{Y_y}$$

## UNIT 14: ELECTRONICS

### Half Wave Rectification

In case of half wave resistance of diode during negative half of A.C resistance is

- A) very high
- B) very low
- C) a few ohms
- D) negative

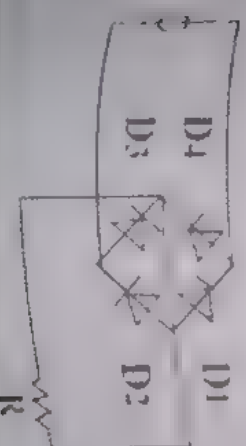
The direction of current through the load resistance of a full-wave rectification circuit

- A) Inverts for negative cycle
- B) Inverts for positive cycle
- C) Changes for every cycle
- D) Remains constant

Output voltage of rectifier is not smooth. It can be made smooth by using a circuit known as:

- A) Heat sink circuit
- B) Bridge circuit
- C) Filter circuit
- D) None of these

In the following figure what happens for the positive half cycle of the input?



11. A & All Series

Answer: A-Solution: Elastic materials have more stress than brittle materials

Answer: B-Solution: Elastic materials have more stress than brittle materials

Answer: D-Solution: Elastic materials have more stress than brittle materials

Answer: A-Solution: In stress-strain graph, order is proportional limit, yield point limit, elastic limit, UTS

Answer: B-Solution: Area under curve - Extension

Answer: D-Solution: Strain energy is stored as elastic potential energy

Answer: D-Solution: Strain energy is stored as elastic potential energy

Answer: D-Solution: Strain energy is stored as elastic potential energy

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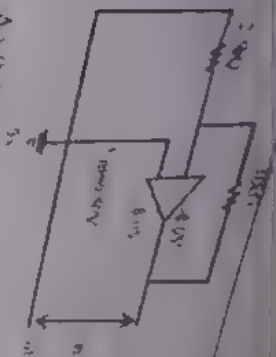
Answer: D-Solution: Strain energy is stored as elastic potential energy

Answer: D-Solution: Strain energy is stored as elastic potential energy

Answer: D-Solution: Strain energy is stored as elastic potential energy

Answer: D-Solution: Strain energy is stored as elastic potential energy

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9. A negligible small current between input terminals of the Op-Amp is because of
- A) 8.0 V  
B) 1.2 V  
C) 2.5  
D) 4.9
- A) low input resistance  
B) low output resistance  
C) High output resistance  
D) High input resistance

[2018]

### Key And Solution

1. **Answer: A-Solution:** During negative half cycle, current does not flow, so R is very high
2. **Answer: D-Solution:** During rectification, AC is converted into DC. DC has only one direction
3. **Answer: D-Solution:** filter circuits convert pulsating DC into smooth DC
4. **Answer: C-Solution:** use diode and function known in mind toward and reverse bias etc
5. **Answer: C**
6. **Answer: B-Solution:** Closed loop gain depends on external resistances whereas open loop gain does not depend on external resistances.

## UNIT 15: MODERN PHYSICS

### Photoelectric Effect

1. **Minimum energy required to eject an electron from metal surface is called** [2018]
- A) Work function  
B) Stopping potential  
C) Threshold frequency  
D) Electromotive force
2. **The minimum frequency below which no electrons are emitted in photoelectric effect is called:** [2013]
- A) Threshold frequency  
B) Wavelength  
C) Frequency  
D) Stopping potential
3. **Einstein's photoelectric equation is given by:** [2009]
- A)  $hf - \phi = \frac{1}{2}mv^2$   
B)  $E = mc^2$   
C)  $E = hf$   
D)  $hf = \frac{1}{2}mv^2$

10. If signal is applied to the input of non-inverting amplifier through resistance of  $100k\Omega$ , the gain of amplifier feedback resistance is  $10k\Omega$ , the gain of amplifier is equal to
- A) 11  
B) 11  
C) 10  
D) 0.11

11. **Closed loop gain of op-amplifier depends upon** [2015]
- A) Internal resistance  
B) External's connected resistance  
C) Internal circuit  
D) Applied voltage

7. **Answer: C-Solution:**  $G = \frac{V_o}{V_i} \Rightarrow V_o GV_i = 80$ ,  
 $25 = 2$   
 $G = 1 + \frac{R_2}{R_1} = 1 + \frac{10}{2.5} = 5$
8. **Answer: C-Solution:**  $G = \frac{V_o}{V_i} \Rightarrow V_o = GV_i = 5$ ,  
 $0.50$
9. **Answer: D-Solution:** Input resistance is very high
10. **Answer: B-Solution:**  $G = 1 + \frac{R_2}{R_1} = 1 + \frac{100k\Omega}{10k\Omega}$   
 $G = 11$
11. **Answer: B-Solution:**  $G = 1 + \frac{R_2}{R_1}$  or  $\frac{R_2}{R_1}$   
It depends on external resistances.

4. **In photoelectric effect removal of photons is observed at energies.** [2008]
- A) Low  
B) High  
C) Intermediate  
D) Both A and C

5. **What is emitted by a hot metal filament in a cathode ray tube?** [2008]
- A) X-ray  
B) Proton  
C) Electron  
D) Photon

### Energy Of Photon

6. **The value and units of the Planck constant 'h' can be expressed as:** [2019]
- A)  $6.63 \times 10^{-34} Js$   
B)  $6.63 \times 10^{-34} Js$   
C)  $6.63 \times 10^{-34} Js$   
D)  $3.63 \times 10^{-34} Js$



Calculate the energy of a photon of frequency  $3.0 \times 10^{16}$  Hz ( $h = 6.63 \times 10^{-34}$ )

- A)  $19.89 \times 10^{-18}$  J  
B)  $1.89 \times 10^{-18}$  J  
C)  $11.89 \times 10^{-18}$  J  
D)  $19.89 \times 10^{-18}$  J

In photo-emission from a metal, if light of  $\lambda$  is replaced by light of wavelength  $2\lambda$ , the maximum kinetic energy of the photo-electrons

- A) Decreases by an amount equal to half of an incident photon of wave length  $\lambda$   
B) Increases by an amount equal to four times energy of incident photon of  
C) Increases by an amount equal to the work function of the metal  
D) Decrease by an amount equal to the energy of an incident photon of wave length  
9. Light photons, each of energy  $3.5 \times 10^{-19}$  J falls on the cathode of a photocell. The current through the cell is reduced to zero by taking the cathode to a potential  $+0.25$  V relative to anode. The work function of the cathode is;

- A)  $3.35 \times 10^{-19}$  J  
B)  $3.5 \times 10^{-19}$  J  
C)  $3.25 \times 10^{-19}$  J  
D)  $3.1 \times 10^{-19}$  J

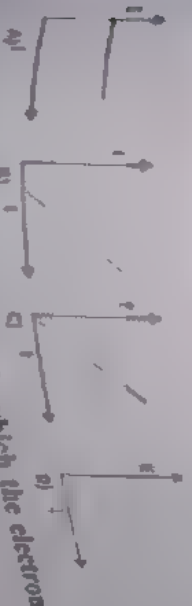
A 5 watt LED bulb converts 80% of the power into light photons of wavelength 660 nm. What is the number of photons emitted from the bulb in one second?

- A)  $5.8 \times 10^{17}$   
B)  $5 \times 10^{17}$   
C)  $6.10 \times 10^{17}$   
D)  $1.3 \times 10^{18}$

Calculate the frequency of a photon having a momentum of  $4.42 \times 10^{-26}$  Ns;

- A)  $2 \times 10^{14}$  Hz  
B)  $2 \times 10^{15}$  Hz  
C)  $5 \times 10^{15}$  Hz  
D)  $2 \times 10^{16}$  Hz

The maximum kinetic energy 'E' of photoelectrons ejected by light of a certain wavelength from a metal is measured as function of the intensity 'I' of the light. Which one of the following graphs represents the way in which 'E' depends on 'I'?



The kinetic energy K.E. with which the electron strikes the target is given by:

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- A) K.E.  $eV$   
B) K.E.  $hc/\lambda$   
C)  $hc/\lambda$   
D) K.E.  $eV$

In pair production, the type of photon used

- A) Particle  
B) Photon  
C) X-ray  
D) Gamma ray

The atom is excited to an energy level E<sub>1</sub> from its ground state energy level E<sub>0</sub> the wavelength of the radiations emitted is

- A)  $\frac{hc(E_1 - E_0)}{E_1}$   
B)  $\frac{hc(E_1 - E_0)}{E_0}$   
C)  $\frac{hc(E_1 - E_0)}{E_1 - E_0}$   
D)  $\frac{hc(E_1 - E_0)}{E_1 + E_0}$

If an electron in the 'K' shell is removed and an 'L' shell, it emits a photon of energy.

- A)  $h\nu = E_K - E_L$   
B)  $h\nu = E_L - E_K$   
C)  $h\nu = E_K + E_L$   
D)  $h\nu = E_K - E_L$

The De Broglie's wavelength of an electron travelling with a speed of  $1.0 \times 10^6$  m/s equal to ( $h = 6.6 \times 10^{-34}$  Js and  $m_e = 9.1 \times 10^{-31}$  kg)

- A)  $7.3 \times 10^{-7}$  m  
B)  $7.3 \times 10^{-8}$  m  
C)  $7.3 \times 10^{-9}$  m  
D)  $7.3 \times 10^{-10}$  m

The momentum of wave of wavelength  $1.32 \times 10^{-8}$  is

- A)  $5 \times 10^{-10}$  Ns  
B)  $5 \times 10^{-11}$  Ns  
C)  $5 \times 10^{-12}$  Ns  
D)  $5 \times 10^{-13}$  Ns

If a particle of mass 5.0 mg moves with the speed of 8.0 m/sec, then the de-Broglie's wavelength will be:

- A)  $1.36 \times 10^{-28}$  m  
B)  $1.70 \times 10^{-28}$  m  
C)  $1.65 \times 10^{-28}$  m  
D)  $1.66 \times 10^{-28}$  m

Discrete Energy levels of hydrogen atom is equal to

- A) 13.6 eV  
B) 0.54 eV  
C) 0.85 eV  
D) 1.30 eV

Speed of electron in the first hydrogen orbit is:

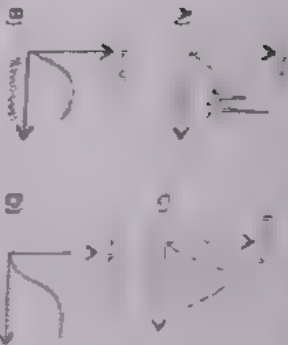
- A)  $2.19 \times 10^6$  m/s  
B)  $2.19 \times 10^8$  m/s  
C)  $2.2 \times 10^8$  m/s  
D)  $3 \times 10^8$  m/s

Atomic hydrogen spectrum which of the following series lies in visible region of electromagnetic spectrum?

- A) Lyman series  
B) Paschen series  
C) Balmer series  
D) Bohr Series

[2008]

### 23. Which of the following spectra is most typical of the output of an X-ray tube



[2016, 2014]

### 24. The target of X-ray tube is made of which metal?

- A) Iron  
B) Nickel  
C) Brass  
D) Tungsten

[2016]

### 25. The X-rays consist of

- A) High energy proton  
B) High energy electrons  
C) High energy rays  
D) High energy photon

### 26. The shadow of the bones in X-ray's photographic film appears lighter than the surrounding flesh due to

[2016]

- A) Bones reflect greater amount of X rays  
B) Bones absorb greater amount of X-rays  
C) Bones absorb less amount of X rays  
D) Bones totally reflect X-rays

[2016]

### 27. The continuous spectrum of X-ray is formed due to

- A) Characteristics of X-ray  
B) Bremsstrahlung X-ray  
C) Soft X-ray  
D) Hard X-ray

### 28. In X-ray tube, electrons after being accelerated through velocity 'v' strike the target, then the wavelength of emitted X-rays is:

[2015]

- A) Not greater than  $\frac{hc}{mv}$   
B) Not less than  $\frac{hc}{mv}$   
C) Equal to the  $\frac{h}{mv}$   
D) Equal to  $\frac{h}{mv}$

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### 29. Not less than the case when the electrons lose their kinetic energy (K.E.) in the first collision, an X-ray photon emitted has which of the following set of frequency and wavelength?

- A)  $\{f_{min}, \lambda_{max}\}$   
B)  $\{f_{max}, \lambda_{min}\}$   
C)  $\{f_{min}, \lambda_{min}\}$   
D)  $\{f_{max}, \lambda_{max}\}$

### 30. The potential difference between target and cathode of an X-rays tube is 20 kV and current is 20 mA. What is the $\lambda_{min}$ of the emitted X-rays?

- A)  $6.19 \times 10^{-14} m$   
B)  $5.19 \times 10^{-14} m$   
C)  $6.19 \times 10^{-11} m$   
D)  $6.19 \times 10^{-12} m$

### 31. What will be the energy of accelerated electrons used to produce X-rays accelerating potential is 20 kV?

- A)  $2 \times 10^{10}$   
B)  $1.6 \times 10^{10}$   
C)  $3 \times 10^{-16}$   
D)  $3.2 \times 10^{10}$

### 32. Kinetics energy of electrons by applying potential difference V, across the X-ray tube is $KE_1$ while V, potential difference produces kinetic energy equal to $KE_2$ . What will be value of $KE_1/KE_2$ if ratio of potential difference $V_1/V_2 = 2/3$ ?

[2013]

- A) 3/2  
B) 4/9  
C) 9/4  
D) 2/3

### 33. X-rays from a given X-ray tube operating under specified conditions have a minimum wavelength. The value of this minimum wavelength could be reduced by

[2013]

- A) Cooling the target  
B) Increasing the potential difference between cathode and the target  
C) Reducing the temperature of the filament  
D) Reducing the pressure in the tube
34. What will be the relation for the speed of electron accelerated towards the target in X-ray tube by applying potential difference 'V', take mass of electron 'm' and charge on electron 'e'?

[2013]

- A)  $V = \sqrt{2Ie/m}$   
B)  $V = \sqrt{2me/I}$   
C)  $V = \sqrt{2I/me}$   
D)  $V = \sqrt{2me/I}$

### 35. What is the type of characteristics X-ray photon whose energy is given by relation $hf = E_m - E_n$ ?

[2013]

- A) K - alpha  
B) M - alpha  
C) K - beta  
D) M - beta

X-rays can be produced by bombardment of on target metal:

10. [2015]  
 A) Protons B) Electrons  
 C) Neutron D) Alpha particles  
 Which of the following property must be there in a substance so that it can be used as target in X-ray tube?

11. [2012]  
 A) It must have low melting point  
 B) It must have low atomic number  
 C) It must have high reflecting ability  
 D) It must have high atomic number

12. [2014]  
 Wavelength of X-rays is the order of:

- A)  $10^{-4}$  m  
 B)  $10^{-3}$  m  
 C)  $10^{-2}$  m  
 D)  $10^{-1}$  m

13. [2011]  
 When electrons lose all their kinetic energy in the first collision, the entire kinetic appears as an X-ray photon of energy:

- A)  $K.E = eV$   
 B)  $K.E = h\lambda_{min}$   
 C)  $K.E = hc/\lambda_{min}$   
 D)  $K.E = h/\lambda_{min}$

14. [2011]  
 The characteristic X-ray spectrum is due to

- A) The absorption of neutrons by target material  
 B) The bombardment of target material by protons  
 C) The bombardment of target material by electrons  
 D) The bombardment of target material by alpha particles

15. [2009]  
 A crack allows greater amount of X-rays to pass, which appears on photographic film

- A) Blue Area B) Dark Area  
 C) Bright Area D) Red Area

Key and Solution

Answer: A-Solution: Definition of work function  
 Minimum energy required to eject an electron from metal surface.

2. Answer: A-Solution: the minimum frequency below which not electrons are emitted is called Threshold frequency.

3. Answer: A-Solution: Einstein photoelectric equation  
 $h\nu - \phi = \frac{1}{2}mv^2$

Answer: D-Solution: In photo electric effect protons is observed at both low and high energies  
 Answer: C-Solution: Electrons are emitted by hot metal filament in cathode ray tube

Answer: C-Solution:  $h = 6.63 \times 10^{-34} \text{ Js}$

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7. Answer: D-Solution:  $E = h\nu$   
 $E = (6.61 \times 10^{-34})(3.0 \times 10^{14})$   
 $E = 1.983 \times 10^{-19} \text{ J}$

8. Answer: B-Solution:  $\lambda = \frac{hc}{E}$   
 $\lambda = \frac{6.63 \times 10^{-34}}{4 \times 10^{-19}} = 1.66 \times 10^{-16} \text{ m}$

9. Answer: D-Solution:  
 $K.E = V_e = 0.4 \times 10^{-19} \text{ J}$   
 $\phi = h\nu - K.E$   
 $\phi = E - K.E$

10. Answer: D-Solution:  $E = \frac{hc}{\lambda}$   
 $E = 3.01 \times 10^{-26} \text{ J}$   
 $E_1 = W = P_1 = P_1(0.8) = 4 \text{ J}$   
 $n = \frac{E_1}{E}$

11. Answer: B-Solution:  $P = 4.42 \times 10^{-26} \text{ W}$   
 $f = 2$

12. Answer: A-Solution: Energy does not depend upon intensity of light.  
 $f = \frac{(4.42 \times 10^{-26})(3 \times 10^8)}{6.62 \times 10^{-34}} = 2 \times 10^{14} \text{ Hz}$

13. Answer: D-Solution: The energy of electron with which it hits the target material is  $K.E = eV$

14. Answer: D

15. Answer: C-Solution:  $\lambda = \frac{hc}{E}$   
 $\lambda = \frac{6.63 \times 10^{-34}}{4 \times 10^{-19}} = 1.66 \times 10^{-16} \text{ m}$

16. Answer: C-Solution:  $K \propto$  represent the vacancy created in K shell and it filled by L shell electron the energy difference we can write  
 $h\nu = E_K - E_L$

17. Answer: C-Solution:  $h = 6.6 \times 10^{-34} \text{ Js}$   
 $m_e = 9.1 \times 10^{-31} \text{ kg}$   
 $v = 1.0 \times 10^7 \text{ m/sec}$   
 $\lambda = ?$

18. Answer: B-Solution:  $P = \frac{h}{\lambda}$   
 $\lambda = \frac{h}{P} = \frac{6.63 \times 10^{-34}}{1.32 \times 10^{-18}} = 5.0 \times 10^{-16} \text{ m}$

19. Answer: B-Solution:  $m = 5 \text{ mg}$   
 $v = 8.0 \text{ m/sec}$   
 $h = 6.6 \times 10^{-34} \text{ Js}$

Answer: B-Solution:  $m = 5 \text{ mg}$   
 $v = 8.0 \text{ m/sec}$   
 $h = 6.6 \times 10^{-34} \text{ Js}$



20. Answer: A-Solution:  $E = \frac{h\nu}{\lambda} = \frac{hc}{\lambda}$
21. Answer: B-Solution:  $E = \frac{hc}{\lambda} = \frac{13.6}{n^2} = 13.6 \text{ eV}$
22. Answer: C-Solution: Balmer series lies in visible region
23. Answer: A-Solution: Option B ( & D) are not X Rays Graph
24. Answer: D-Solution: Tungsten has high atomic number
25. Answer: D-Solution: The energy of X-Rays is high
26. Answer: B-Solution: Contain greater proportions of bones elements with high atomic number and so they absorb greater amount of X-rays
27. Answer: B
28. Answer: D-Solution:  $E = hf$   
 $E = \frac{hc}{\lambda}$   
 $eV = \frac{hc}{\lambda}$   
 $\lambda = \frac{hc}{eV}$
29. Answer: B-Solution: Energy of electron depends on frequency  
 $= hf_{\text{max}} \text{ and } f \propto \frac{1}{\lambda} \text{ so } \lambda_{\text{min}}$
30. Answer: C-Solution:  $\lambda_{\text{min}} = \frac{1240}{V} \text{ nm}$   $\therefore V = 20 \text{ keV}$

### UNIT 16: NUCLEAR PHYSICS

#### RADIOACTIVITY AND RADIATIONS

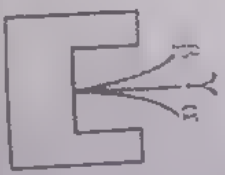
1. Wavelength of  $\gamma$ -rays is [2016]
  - A) Equal to the X-rays
  - B) Longer than X-rays
  - C) Shorter than X-rays
  - D) Broader than X-ray
2. Among the three types of radioactive radiation, which have strongest penetration power? [2015]
  - A) Alpha
  - B) Gamma
  - C) Beta
  - D)  $\alpha, \beta$  and  $\gamma$  have same
3. Three points of radioactive radiation are observed as shown in the figure presence of electric field as shown in the figure radiation is shown in the path 'Y' which type of radiation is shown in the path 'Y'? [2014]
  - A) Alpha
  - B) Gamma

#### NIMS and National MDCAT by All Series

31. Answer: C-Solution:  $V = 2 \text{ kV}$   
 $K_{\text{I}} = 1.6 \times 10^{-17} \text{ (2KV)}$   
 $K_{\text{I}} = 3.2 \times 10^{-17}$
32. Answer: D-Solution:  $K_{\alpha} E \propto V$   
 $K_{\text{I}} E_{\text{I}} = V_{\text{I}}$   
 $K_{\text{I}} E_{\text{I}} = V_{\text{I}}$
33. Answer: B-Solution:
34. Answer: B-Solution:  $\lambda_{\text{min}} = \frac{hc}{V_e}$
35. Answer: A-Solution:  $E = hf \Rightarrow V_e \Rightarrow hf$   
 $K_{\alpha} E = V_e \Rightarrow \frac{1}{2} mV^{-2} = V_e$
36. Answer: C-Solution: When vacancy is created, shell the characteristic X-rays will be  $K_{\alpha}$   
 $K_{\alpha} E = V_e$
37. Answer: D-Solution: X-Rays produced due to bombardment of electrons which is emitted by cathode.
38. Answer: D-Solution: X-Rays high frequency type according to  $Z \propto \sqrt{f}$
39. Answer: B
40. Answer: C
41. Answer: C-Solution: The characteristic X-ray spectrum is due to the bombardment of high materials by electron
42. Answer: B

- C) Beta
- D) Cathode ray

4. In a radioactive phenomenon, observation shows in figure where  $\alpha$  deviates lesser than  $\beta$  in same electric or magnetic field (not shown in the figure) What is the reason of less deviation of  $\alpha$ ? [2012, 2014]



- A)  $\alpha$  is a lighter particle
- B)  $\alpha$  is a faster moving particle
- C)  $\alpha$  is a heavier particle
- D) None of these
5. Emission of radiation from radioactive substance is [2014]
  - A) Dependent on both temperature and pressure

Unit 16 All Series  
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 50. Independent of presence



# All Series

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- A) independent of temperature but dependent on pressure
  - B) independent of pressure but dependent on temperature
  - C) independent of both temperature and pressure
  - D) independent of pressure but dependent on temperature
- What is the charge on alpha particles emitted during the phenomenon of radioactivity?

- A)  $+2e$  [2012]
- B)  $+e$
- C)  $-2e$
- D)  $-e$

The transformation of a neutron into proton in the nucleus gives rise to emission of:

- A) Beta particles [2011]
- B) Alpha particles
- C) Gamma rays
- D) X rays

Gamma rays are the cause of:

- A) severe eye damage [2009]
- B) skin cancer
- C) decay of Microorganisms
- D) All of the above

Beta rays emitted by a radioactive substance is:

- A) An electron which was coming out of the nucleus [2008]
- B) An electron which was coming inside the nucleus
- C) A pulse of electromagnetic wave
- D) A pulse of electron magnetic wave

When a lithium atom loses an electron, it becomes:

- A) An alpha particle [2008]
- B) A proton
- C) A positive hydrogen ion
- D) A negative hydrogen ion

Ionizing capability of gamma rays is:

- A) Equal to alpha and beta particle
- B) Less than alpha and greater than beta particles
- C) Less than both alpha and beta particles
- D) Less than beta but greater than alpha particles

## Nuclear Transmutation

Complete the radioactive equation

- $Z - 86Y + \gamma$  [2017]
- A)  ${}_{86}^{222}Rn$
- B)  ${}_{86}^{222}Po$
- C)  ${}_{86}^{222}At$
- D)  ${}_{86}^{222}Fr$

Emission of  $\gamma$ -rays from radioactive element result into

- A) Increase of charge number [2016]
- B) Decrease of charge number
- C) No change in charge number
- D) Increase of mass number

## MCAT and National MCAT All Series

- 1. The decay of a radioactive substance is:
- A) First order
- B) Second order
- C) Zero order
- D) Third order

In the reaction  ${}_{88}^{226}Ra \rightarrow {}_{86}^{222}Rn + {}_2^4He$ , the electron

- A) is emitted from the nucleus [2016]
- B) is captured by the nucleus
- C) is emitted from the nucleus
- D) is captured by the nucleus

According to the equation  ${}_{88}^{226}Ra \rightarrow {}_{86}^{222}Rn + {}_2^4He$ , what are the atomic and mass numbers of

- A)  ${}_{88}^{226}Ra$  [2015]
- B)  ${}_{86}^{222}Rn$
- C)  ${}_{88}^{226}Ra$
- D)  ${}_{86}^{222}Rn$

A certain radioactive nuclide of mass number 'A' decays by  $\alpha$ -emission and  $\gamma$ -emission to a nuclide of mass number which of the following correctly relates 'A' and 'A'?

- A)  $A - 4$  [2015]
- B)  $A - 2$
- C)  $A - 1$
- D)  $A - 1$

A radioactive nuclide decays by emitting an  $\alpha$ -particle and a  $\gamma$ -ray photon, the change in the nucleon number will be:

- A) -4 [2013]
- B) -2
- C) -1
- D) -3

Emission of alpha decay from a radioactive substance causes

- A) Decrease in 'Z' by 4 and decrease in 'A' by 4 [2013]
- B) Decrease in 'A' by 1 and 'Z' remains same
- C) Decrease in 'Z' by 1 and 'A' remains same
- D) Decrease in 'A' by 4 and decrease in 'Z' by 2

Which one of the following emission takes place in a nuclear reaction?

- A)  ${}_{88}^{226}Ra \rightarrow {}_{86}^{222}Rn + {}_2^4He$  [2013]
- B)  ${}_{88}^{226}Ra \rightarrow {}_{86}^{222}Rn + {}_2^4He + \gamma$
- C)  ${}_{88}^{226}Ra \rightarrow {}_{86}^{222}Rn + {}_2^4He + \gamma + e^-$
- D)  ${}_{88}^{226}Ra \rightarrow {}_{86}^{222}Rn + {}_2^4He + \gamma + e^- + \bar{\nu}_e$

Which of the following effect is observed due to emission of  $\beta$  during the phenomenon of radioactivity?

- A) Increases by 1 and 'A' remains same [2013]
- B) Decreases by 1 and 'A' remains same
- C) Increases by 1 and 'A' remains same
- D) Decreases by 1 and 'A' remains same

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22. In relation  $\lambda T_{1/2} = 0.693$ , which quantity is represented by  $\lambda$

A) Half-life  
C) Activity  
[2019]

23. Calculate the half-life of bismuth-214 which has a decay constant of  $4.3 \times 10^3 \text{ s}^{-1}$

A)  $2.9 \times 10^{-5} \text{ s}$   
C)  $3.9 \times 10^3 \text{ s}$   
[2018]

24. Calculate the activity (decaying atom per unit time) of radioactive strontium-90 having  $6.7 \times 10^{21}$  atoms at  $t=0$  decay constant of strontium-90 is  $8.3 \times 10^{-10} \text{ s}^{-1}$

A)  $8.01 \times 10^{10} \text{ Bq}$   
C)  $5.6 \times 10^{-3} \text{ Bq}$   
[2018]

25. Which relation is correct for radioactive decay:

A)  $\Delta N \propto \Delta t$   
C)  $\Delta N \propto N \Delta t$   
[2016]

26. Decay constant is given by

A)  $\frac{\Delta N}{\Delta t}$   
C)  $\frac{\Delta N}{N}$   
[2016]

27. The relation between decay constant ' $\lambda$ ' and half life  $T_{1/2}$  of radioactive substance is

A)  $\lambda = \frac{1}{T_{1/2}}$   
B)  $\lambda = 0.693 T_{1/2}$   
C)  $\lambda = T_{1/2}^{0.693}$   
D)  $\lambda = \frac{0.693}{T_{1/2}}$   
[2016]

28. The quantity of uranium is 400g. After 3rd half life, how much uranium will be left?

A) 50g  
C) 100g  
[2015]

29. Relation b/w half life and Decay constant ' $\lambda$ ' is given by

A)  $T_{1/2} = \frac{0.693}{\lambda}$   
C)  $T_{1/2} = 1.43 \lambda$   
[2014]

30. A half-life of sodium-24 is \_\_\_\_\_ used to estimate the volume of blood in a patient

A) 6 hours  
B) 15 hours  
C) 8 hours  
D) 15 days  
[2012]

31. Half-life of a radioactive element is:

A) Inversely proportional to square of decay constant  
[2013]

B) Directly proportional to square of decay constant  
C) Directly proportional to decay constant  
D) Inversely proportional to decay constant

32. The ratio of the rate of decay of a parent nucleus (the number of radioactive nuclei present at  $t_0$ ) time is equal to:

A) Half-life of radioactive element  
[2011]

B) Mean life  
C) Decay constant of radioactive element  
D) Activity if radioactive element

33. A certain radioactive mass decays from 64 gm to 2 gm in 20 days. What is its half-life?

A) 5 days.  
C) 10 days.  
[2009]

### Binding Energy

34. Heavy nucleus of atoms go through fission so that they can:

A) Absorb high amount of energy  
B) Absorb low amount of energy  
C) Increase their binding energy per nucleon  
D) Reduce their binding energy per nucleon  
[2019]

35. What name of the energy which is released when an atom is formed from its constituent?

A) Atomic Energy  
C) Nuclear Energy  
B) Radioactive Energy  
D) Binding Energy  
[2018]

### Quarks

36. What is the quark compositions of a proton?

A) Two up quarks and one down quark  
B) Two up quarks and one strange quark  
C) One up quark and two strange quarks  
D) Two down quarks and one up quark  
[2019]

37. \_\_\_\_\_ are the particles that experience strong nuclear force.

A) Electrons  
C) Neutrinos  
B) Muons  
D) Neutrons  
[2008]

The neutron is assumed to be made up of

- 1) One up quark and two down quarks

[2008]

Key and Solution

- 1) Two up quarks and two down  
2) Two up quarks and one down quark  
3) One up quark and one down quark

the

Answer: C-Solution: Gamma

rays have more energy as compared to X-Rays so they have shorter wave length than X Rays.

Answer: B-Solution: Order of radiation power  $\alpha < \beta < \gamma$

Answer: B-Solution: The electric field do not disturbed r-radiation because they have no charge

C-Solution: Alpha particles are massive so deviate less

Answer: C-Solution: Emission of radiation from radioactive substance is depends upon size of atom and number of neutrons.

Hint: Alpha particle is also known as Helium Nuclei, and

Atom Nuclei have positive charge

Answer: A

Answer: D

Answer: C

Answer: C

11. Answer: C-Solution: Gamma

rays have no charge so they have less ionizing ability.

12. Answer: D-Solution:  ${}^a_Z X + {}^b_Y Y + \nu$

13. C-Solution:  ${}^a_Z X \rightarrow {}^b_Y Y + \nu$

14. B

15. Answer: C

16. A-Solution:  ${}^a_Z X \rightarrow {}^b_Y Y + \nu$

17. B-Solution:  $X = i-4$  so  $i = X+4$

18. A-Solution:  ${}^a_Z X \rightarrow {}^b_Y Y + \nu$

19. D-Solution:  ${}^a_Z X \rightarrow {}^b_Y Y + \nu$

20. Answer: C-Solution:  ${}^a_Z X \rightarrow {}^b_Y Y + \nu$

21. B-Solution:  ${}^a_Z X \rightarrow {}^b_Y Y + \nu$

22. Answer: D

23. Answer: B-Solution:

$$T_1 \lambda = 0.693$$

$$\lambda = \frac{0.693}{T_1}$$

24. C-Solution: Activity = Number

of atoms  $\times$  decay constant

25. Answer: A

26. Answer: A-Solution:

$$\lambda = \frac{\Delta N}{N}$$

27. D-Solution:  $T_1 \lambda = 0.693$

$$\lambda = \frac{0.693}{T_1}$$

28. A-Solution:  $N = \frac{M}{2} = \frac{400}{2} = 50g$

29. D-Solution:  $T_1 = \frac{0.693}{\lambda}$

30. Answer: B-Solution Half life of sodium -24 is 15 hours

31. D-Solution:  $T_1 = \frac{0.693}{\lambda}$

32. Answer: C

33. B-Solution:  $n \leq 5$ , so  $T = \text{time}$

taken number of half life

34. C, 35 D, 36 D, 37 D, 38 D, 39 A

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- Which of the following is the major advantage of using a light microscope instead of an electron microscope?  
 A) Smaller or Resolving power  
 B) Constant depth of focus  
 C) Observed in 3D  
 D) Used in various sectors
- Some cellular organelles are bound by a single membrane while other organelles have two membrane (envelops) around them  
 Which of the following is correct?  
 Single membrane Double membrane  
 A) Peroxisomes, Nucleus, chloroplast  
 lysosome  
 B) Chloroplast, Nucleus  
 lysosome peroxisomes  
 C) Nucleus, Lysosome  
 chloroplast peroxisomes  
 D) Nucleus, lysosome  
 chloroplast, peroxisomes
- Which of the following cell structures contains the highest concentration of RNA  
 A) Centriole  
 B) Lysosome  
 C) Chromosomes  
 D) Nucleoli
- A tadpole's tail is gradually broken down during metamorphosis into an adult frog. Which organelles increases in number in the cells of the tail at this time  
 A) Centriole  
 B) Endoplasmic reticulum  
 C) Golgi complex  
 D) Lysosomes
- Which of the following organelles always contains DNA?  
 A) Centriole  
 B) Golgi complex  
 C) Lysosome  
 D) Mitochondria
- Which distinguishes a prokaryotic cell from eukaryotic cells?  
 A) Prokaryotic cell have a cell wall and nucleus  
 B) Prokaryotic cells have no membrane bound organelles

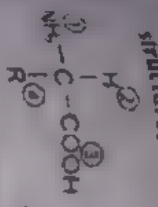
Chapter 1: Key

- Prokaryotic cells have a centriole  
 D) Prokaryotic cells have no ribosomes
- The elasticity of the plasma membrane demonstrates that it is made up of lipid bilayers  
 A) Lipids  
 B) Nucleic acids  
 C) Carbohydrates  
 D) Proteins
- Filaments present in flagella and cilia are  
 A) Microtubules  
 B) Microvilli  
 C) Microfilaments  
 D) Microsomes
- Which of the following structure is found in all living organisms?  
 A) Cell membrane  
 B) Nucleus  
 C) Lysosome  
 D) Vacuole
- The cell wall of plant cell is different from that of prokaryotes in:  
 A) Both structure and chemical composition  
 B) Structure only  
 C) Chemical composition only  
 D) Number of layers only
- Which of the following are present in prokaryotic cells  
 A) Chloroplast, DNA Nuclear envelope  
 B) Chromosomes, Mitochondria envelope  
 C) Cytoplasm, DNA Mitochondria  
 D) Cytoplasm, DNA, ribosome
- Which of the following is present in all eukaryotic cells:  
 A) Cell wall  
 B) Diploid nucleus  
 C) Flagellum  
 D) Membrane bound organelles
- Which of the following would be more prominent in secretory cell than nonsecretory cell:  
 A) Lysosome  
 B) Golgi complex  
 C) Mitochondria  
 D) Ribosomes
- When a glycoprotein is being synthesized in secretion from a cell, which route is it most likely to take?  
 A) Golgi complex → RER → SER  
 B) RER → Golgi complex → SER  
 C) RER → SER → Golgi → complex  
 D) SER → Golgi complex → RER
- Which of the following is responsible for cytokinesis  
 A) Microtubules  
 B) Microfilaments  
 C) Intermediate filament  
 D) None of them

1. C 2. A 3. D 4. D 5. D 6. B 7. A 8. B 9. A 10. D



1. An amino acid molecule has the following structure:



Which two of the groups combine to form a peptide link between two amino acids?

- A) 1 and 2  
 B) 1 and 3  
 C) 2 and 3  
 D) 2 and 4

2. Which class of molecule is the major component of cell membrane?

- A) Phospholipid  
 B) Cellulose  
 C) Triglyceride  
 D) Wax

3. Glycerol is the backbone molecule for

- A) ATE  
 B) Leptines  
 C) Neutral lipids  
 D) Steroids

4. A fatty acid is unsaturated if it

- A) Contains hydrogen  
 B) Contains double bonds  
 C) Contains on acid group  
 D) All of them

5. In RNA the nitrogen base that takes the place of thymine is

- A) Adenine  
 B) Cytosine  
 C) Guanine  
 D) Uracil

6. The ending -ose means a substance is a

- A) Sugar  
 B) Lipid  
 C) Protein  
 D) Nucleic acid

7. Glycolipids and lipoprotein are important component of

- A) Cellular membrane  
 B) Cell wall  
 C) Both of them  
 D) None of them

8. When two amino acids are to form peptide linkage is removed

- A) Hydroxyl  
 B) Water  
 C) Carbon  
 D) Nitrogen

9. What is the theoretical number of chemically different dipeptides that may be assembled from two different amino acids?

- A) One  
 B) Two  
 C) Three  
 D) Four

10. A polar molecule is in water?

- A) Soluble  
 B) Insoluble  
 C) Reactive  
 D) Inert

11. Which statement correctly describes a property of water?

- A) A relatively large amount of heat is needed to increase its temperature  
 B) At normal room temperature, its molecules are bound together by ionic bonds  
 C) The highest density of water occurs below its freezing point  
 D) Water acts as solvent for nonpolar molecules

12. Estrogen, vitamin-D and cholesterol are all examples of

- A) Glycolipids  
 B) Lipoproteins  
 C) Terpenes  
 D) Steroids

13. Which term includes all others?

- A) Carbohydrate  
 B) Starch  
 C) Monosaccharide  
 D) Polysaccharide

14. Choose the pair of terms that correctly completes this sentence: Nucleotide are to as -are to proteins

- A) Nucleic acids, amino acids  
 B) Amino acids, Polypeptides  
 C) Glycosidic linkages, polypeptide linkages  
 D) Polymers, Polypeptides

15. The enantiomer of D-glucose is

- A) D-galactose  
 B) L-galactose  
 C) Both  
 D) None of them

Chapter 2: Keys

1. B	3. C	5. D	7. A	9. B	11. A	13. A	15. D
2. A	4. B	6. A	8. B	10. A	12. D	14. A	

Chapter 3: Enzymes

1. Encircle the correct answer from the given choices

L The catalytic activity of an enzyme is restricted to its small portion called

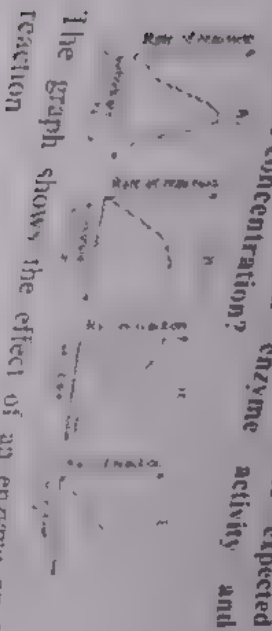
- A) Active site  
 B) Passive site

C) Regulation site  
 D) Allosteric site

2. Which of the following has a coenzyme activity?  
 A) NAD  
 B) Ca  
 C) Both A and B  
 D) None of them

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4. Which of the relationship between substrate concentration and enzyme activity and
- A) active sites  
B) allosteric site  
C) Both A and B  
D) none of them



The graph shows the effect of an enzyme on a reaction



Which combination identifies X, Y and Z?

	X	Y	Z
A) Catalyzed reaction	Catalyzed reaction	Activation energy	Activation energy
B) Catalyzed reaction	Catalyzed reaction	Energy loss	Energy loss
C) Catalyzed reaction	Catalyzed reaction	Energy gained by product	Energy gained by product
D) Catalyzed reaction	Catalyzed reaction	Overall energy change	Overall energy change

5. Combination of Apo enzyme and coenzyme
- A) Prosthetic group  
B) holoenzyme  
C) Fozyme  
D) isoenzyme
6. The specificity of enzymes is due to the
- A) Surface configuration  
B) pH

### Chapter 3 : Keys

1. A | 2. A | 3. B | 4. B | 5. C | 6. B | 7. A | 8. D | 9. B | 10. D | 11. A | 12. B

### Chapter 4: Bioenergetics

1. Removal of the source of carbon dioxide from photosynthesizing chloroplast results in rapid changes in the concentration of certain chemicals. Which one of the following represents the correct combination of concentration changes?

	ATP	B-phosphates	Phosphoglyceric acid (PGA)
A) decreases	decreases	increases	increases
B) decreases	increases	increases	decreases
C) increases	increases	decreases	decreases
D) increases	decreases	decreases	increases

### NUNIS and National MDCAT by All Series

7. All an essential feature of a competitive inhibitor is its ability to k
- A) Activate an operator gene  
B) Combine with prosthetic group  
C) Modify a substrate  
D) occupy an active site
8. The reaction rate salivary amylase with starch decreases as the concentration of chloride ions reduced Which of the following describe the role of the chloride ions
- A) Allosteric inhibitors  
B) cofactors  
C) Coenzyme  
D) competitive inhibitors
9. How does the enzyme increase the rate of a reaction?
- A) By bringing the reacting molecule into proper orientation  
B) By increasing the rate of random collisions  
C) By shifting the point of equilibrium of the reaction  
D) By Supporting the energy required to start the reaction

10. Many enzymes are secreted in inactive form to protect
- A) Cell protein  
B) Mitochondria  
C) Cell membrane  
D) cell DNA
11. Trypsin is an example of
- A) Carbohydrates  
B) Proteases  
C) Lipases  
D) nucleases
12. Ribozymes consist of:
- A) Only protein  
B) protein and non protein part  
C) Only RNA  
D) none of them

2. What are the products of the light reaction in photosynthesis?
- A) ATP and NADP  
B) ATP & AOPH<sub>2</sub> oxygen  
C) ATP, PGA and NAM  
D) ATP, PGA & oxygen

3. During the light dependent stage of photosynthesis, the photo activated pigment removes an electron from the hydroxyl radical derived from the water molecule. The fate of the free hydroxyl radical is that it:
- A) Is broken down into oxygen and a free radical of hydrogen





1. The following illness is caused by a
1. C
  2. C
  3. B
  4. C
  5. B
  6. C
  7. C
  8. B
  9. A
  10. A
  11. C

Chapter 5: Keys

Chapter 6: Prokaryotes

1. Cyanobacteria:
  - A) Carbon
  - B) Oxygen
  - C) Hydrogen
  - D) Nitrogen
2. Cyanobacteria, unlike other types of bacteria that photosynthesize
  - A) Not give off oxygen
  - B) Give off oxygen
  - C) Not have chlorophyll
  - D) Not have a cell wall
3. Pill are made up of pili, which is
  - A) Carbohydrates
  - B) Lipids
  - C) Protein
  - D) Triglycerides
4. Most pathogenic bacteria cause disease by
  - A) Directly destroying individual cell of the host
  - B) Depriving the host of their nutrients
  - C) Producing toxins
  - D) Depriving the host of oxygen
5. Chemosynthetic bacteria
  - A) Are autotrophic
  - B) Use the sun rays
  - C) Oxidize inorganic compounds to acquire energy
  - D) Both A and C are correct

Chapter 6: Keys

1. C
2. B
3. C
4. A
5. D
6. D
7. B
8. D
9. A
10. C

Chapter 7: Protista and fungi

1. Which of the following is true of both fungi and some types of bacteria?
  - A) They have both produce gametes
  - B) They both engulf microscopic animals
  - C) They both absorb materials across cell wall
  - D) They both fix nitrogen
2. The cell wall consists of two overlapping shells in
  - A) Euglenoids
  - B) Diatoms
  - C) Dinoflagellata
  - D) Brown algae
3. Which algal group is misnamed?
  - A) Green algae
  - B) Brown algae
  - C) Red algae
  - D) Blue-green algae

10. HIV attaches to
  - A) Motor neuron
  - B) Sensory neuron
  - C) Brain
  - D) Muscle
11. Hepatitis D is caused by
  - A) Bacteria
  - B) Virus
  - C) Prions
  - D) Viroid

6. A bacterium with flagella all around is
  - A) Monotrichous
  - B) Lophotrichous
  - C) Amphitrichous
  - D) Peritrichous
7. Conjugate is facilitated by
  - A) Capsule
  - B) Pili
  - C) Flagella
  - D) both pili and flagella
8. Bacterial membrane differ from eukaryotic membrane in
  - A) Lacking proteins
  - B) Lacking lipids
  - C) Lacking polysaccharide
  - D) Lacking cholesterol
9. Bacterial membrane also contains enzymes for
  - A) Respiration
  - B) Photosynthesis
  - C) Protein synthesis
  - D) Secretion
10. Facultative anaerobes
  - A) Require a constant supply of oxygen
  - B) Are killed in an oxygenated environment
  - C) Do not always need oxygen
  - D) Are photosynthetic

1. B) Dinoflagellates - two parts shell
2. C) Brown algae - include the largest seaweed
3. D) Diatoms - phytoplankton
4. The feeding stage of a slime mold is called
  - A) Hyphae
  - B) Plasmodium
  - C) Rhizoids
  - D) Mycelium
5. Which is found in slime molds but not in fungi?
  - A) Non-motile spores
  - B) Amoeboid adult
  - C) Rhizoids
  - D) Photosynthetic
6. Fungi resemble animals because they are
  - A) Saprotrophic
  - B) Autotrophic
  - C) Heterotrophic
  - D) Photoautotrophic



1. Heterotrophs  
 a) Heterotrophs  
 b) Heterotrophic  
 c) Heterotrophic  
 d) Heterotrophic

2. Which of the following is not a part of the life cycle of an alternation of generations?

- a) Unicellular haploid form  
 b) Unicellular diploid form  
 c) Unicellular diploid form  
 d) Unicellular diploid form

3. A

4. B

5. B

6. C

7. A

8. A

9. D

10. D

11. D

12. D

13. D

14. D

15. D

16. D

17. D

18. D

19. D

20. D

21. D

22. D

23. D

24. D

25. D

26. D

27. D

28. D

29. D

30. D

## Chapter 8: Diversity amongst Plants

1. Moss plants develop from

- a) oospore  
 b) protonema  
 c) antherozoids  
 d) diploid spores

2. Fern plant is

- a) Diploid sporophyte  
 b) Haploid gametophyte  
 c) Haploid sporophyte  
 d) Haploid gametophyte

3. Gymnosperms are characterized by

- a) multi-faceted spores  
 b) Naked seeds  
 c) Winged seeds  
 d) Seeds inside fruits

4. Where a megasporangium is present in an angiosperm?

- a) In the style of a flower  
 b) Within an ovule  
 c) In the stigma of a flower  
 d) Packed into pollen sacs

5. Gametophyte generation is dominant in

- a) pteridophytes  
 b) Gymnosperms  
 c) Bryophytes  
 d) Angiosperms

## Chapter 8: Keys

1. A | 2. A | 3. C | 4. A | 5. D | 6. B | 7. A | 8. B | 9. B | 10. C

## Chapter 9: Diversity Amongst Animals

1. All animals are

- a) Autotrophs  
 b) Heterotrophs  
 c) Unicellular  
 d) Multicellular

2. Which of the following is not

- a) Cnidarians  
 b) Nematodes  
 c) Annelids  
 d) Mollusks

3. Which of the following class of animals includes the first vertebrates to appear on Earth?

- a) Agnatha, the jawless fishes  
 b) Chondrichthyes, the shark

7. Which of the following most clearly demonstrates the evolutionary relationship between annelids and arthropods?  
A) a complete digestive tract  
B) an exoskeleton  
C) Radial symmetry  
D) Body segments
8. Reptiles are much more extensively adapted to life on land than amphibians in that reptiles  
A) have shelled eggs  
B) have a complete digestive tract  
C) are endothermic  
D) go through the larva stage
9. Amphibians arose from  
A) Cartilaginous fish  
B) jawless fish  
C) Ray finned  
D) Bony fishes with lungs

Chapter 9: Keys

1. B | 2. A | 3. A | 4. B | 5. C | 6. D | 7. D | 8. A | 9. B | 10. B | 11. D | 12. A

Chapter 10: Forms and Functions in Plants

1. It is found essentially in organic compounds.  
A) Calcium  
B) Nitrogen  
C) Phosphorus  
D) Chlorine
2. Chlorosis does not occur due to the deficiency of  
A) Sulphur  
B) Magnesium  
C) Phosphorus  
D) Calcium
3. Carnivorous plants use insects as a source of  
A) Water  
B) Nitrogen  
C) Oxygen  
D) Calcium
4. Most of the uptake of water and minerals from soil takes place through  
A) Epidermal cell  
B) Root cap  
C) Root  
D) Root hair
5. Which of the following is closest to the center of a woody stem?  
A) Vascular cambium  
B) Old xylem  
C) Old phloem  
D) Cell walls
6. Symplast is the movement of water through  
A) Vacuoles  
B) Interspaces  
C) Cytoplasm of cells  
D) Guard cells
7. Guard cells are the only cells of epidermis, which have:

Chapter 10: Keys

1. C | 2. C | 3. D | 4. D | 5. D | 6. C | 7. B | 8. B | 9. D | 10. B | 11. B | 12. B

Chapter 11: Digestion

10. Which of these does not pertain to deuterostome?  
A) Blastopore is associated with the mouth  
B) spiral cleavage  
C) Lateral coelom  
D) Cephalochordate
11. Which of the following has a gastrovascular cavity?  
A) Sponges  
B) earth worms  
C) Roundworms  
D) Flatworms
12. Which of the following is not a subphylum of chordate  
A) Hemichordate  
B) urochordata  
C) Cephalochordate  
D) Vertebrate

pepsinogen is activated to pepsin by

- 1 A) Active secretin
- B) Hydrochloric acid
- C) Active pepsin and HCl
- D) Testin

liver secretes bile into the

- 2 A) duodenum
- B) Ileum
- C) Jejunum
- D) Pottotone

Emulsification of fat will not occur in the

- 3 A) Large intestine
- B) Small intestine
- C) Duodenum
- D) Pottotone

Fatty acids and glycerol are first absorbed by

- 4 A) Villi
- B) Villi
- C) Blood capillaries
- D) Lacteal capillaries

The diagram shows part of the human alimentary canal. Which two structures produce substances involved in the digestion of fat?



### Chapter 12: Keys

- 1 C
- 2 A
- 3 C
- 4 A
- 5 B
- 6 C
- 7 A
- 8 C
- 9 B

### Chapter 12: Circulation

- 1 The rhythmic beating of cardiac muscle in the mammalian heart is initiated by the
  - A) Atrial myocytes
  - B) Parasympathetic nervous system
  - C) Sympathetic nervous system
  - D) Purkinje fibers
- 2 A red blood cell, entering the right side of the heart, passes by or through the following structure:
  - 1 Right atrium
  - 2 Semilunar valve
  - 3 Right ventricle
  - 4 Left ventricle
- 3 In which order will the red blood cell pass the structures?
  - A) 2 → 3 → 1 → 4 → 5
  - B) 3 → 1 → 5 → 4 → 2
  - C) 1 → 5 → 3 → 2 → 4
  - D) 5 → 3 → 1 → 4 → 2
- 4 What effect would be caused by cutting the sympathetic nerve fibers to the heart?
  - A) a decrease in the heart rate
  - B) a decrease in the length of the diastolic phase
  - C) a decrease in the length of the systolic phase
  - D) a decrease in the length of the diastolic phase

- 5 A) and B) National MBE A) by All Sudan
- 6 A) and B) 1 and 4
- 7 A) and B) 1 and 4
- 8 A) and B) 1 and 4
- 9 A) and B) 1 and 4
- 10 A) and B) 1 and 4
- 11 A) and B) 1 and 4
- 12 A) and B) 1 and 4
- 13 A) and B) 1 and 4
- 14 A) and B) 1 and 4
- 15 A) and B) 1 and 4
- 16 A) and B) 1 and 4
- 17 A) and B) 1 and 4
- 18 A) and B) 1 and 4
- 19 A) and B) 1 and 4
- 20 A) and B) 1 and 4

- 1 A decrease in the stroke volume
  - A) produces systemic blood pressure
  - B) produces systemic blood pressure
  - C) produces systemic blood pressure
  - D) produces systemic blood pressure
- 2 What produces systemic blood pressure?
  - A) Contraction of the right atrium
  - B) Contraction of the right ventricle
  - C) Contraction of the left atrium
  - D) Contraction of the left ventricle
- 3 Human heart is
  - A) Myogenic
  - B) Neurogenic
  - C) Cardiac
  - D) Dorsal
- 4 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 5 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 6 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 7 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 8 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 9 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 10 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 11 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 12 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 13 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 14 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 15 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 16 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 17 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 18 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 19 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves
- 20 Typical lub-dub sounds heard in heart are due to
  - A) Closing of bicuspid and tricuspid valves
  - B) Closing of bicuspid and tricuspid valves
  - C) Closing of bicuspid and tricuspid valves
  - D) Closing of bicuspid and tricuspid valves



- is situated in head
- A) in the wall of right atrium
  - B) on interatrial septum
  - C) on interventricular septum
  - D) in the wall of left atrium
- During ventricular systole in a mammalian heart the
- A) Ventricular pressure increases
  - B) atria ventricular valves increase
  - C) Semilunar valves open
  - D) Aortic pressure decreases
- Lymph returns to blood
- A) Oxygen
  - B) Carbon dioxide
  - C) Interstitial fluid
  - D) White blood cells

Chapter 12: Keys

- |      |      |      |      |      |      |      |      |      |       |       |       |       |
|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|
| 1. D | 2. D | 3. A | 4. D | 5. A | 6. D | 7. A | 8. A | 9. A | 10. C | 11. D | 12. C | 13. A |
|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|

Chapter 13: Immunity

1. Plasma cells are
  - (A) the same as memory cells
  - (B) formed from blood plasma
  - (C) B cells that are actively secreting antibody
  - (D) inactive T cells carried in the plasma
2. Antibodies combine with antigens
  - (A) at variable regions
  - (B) at constant region
  - (C) only if macrophages are present
  - (D) both A and C are correct
3. Vaccines are
  - (A) the same as monoclonal antibodies
  - (B) treated bacteria or viruses or one of their proteins
  - (C) major histocompatibility complex proteins
  - (D) not destroyed by heating
4. In addition to the immune system, we are protected from disease by
  - A) body temperature
  - B) hormones
  - C) antigens
  - D) mucous membrane & cilia
5. Fevers
  - A) decrease interferon production
  - B) decrease the concentration of iron in the blood

Chapter 13: Keys

- |      |      |      |      |      |      |      |      |      |       |
|------|------|------|------|------|------|------|------|------|-------|
| 1. C | 2. A | 3. A | 4. D | 5. B | 6. A | 7. B | 8. C | 9. B | 10. B |
|------|------|------|------|------|------|------|------|------|-------|

11. Lymph most closely resembles which of the following?
  - A) Blood
  - B) Urine
  - C) Water
  - D) Interstitial fluid
12. Which of these factors has little effect on blood flow in arteries?
  - A) total cross sections area of vessels
  - B) Blood pressure
  - C) Skeletal muscle contraction
  - D) Heartbeat
13. The Sino Atrial node (SA node)
  - A) Regulates the rhythm of contraction
  - B) Is also called AV node
  - C) Regulates the rate of contraction
  - D) Is also called bundle of His



What blood leaves the capillary bed most of the carbon dioxide is in the form of:

- A) bicarbonate ions  
B) hydroxyl ions  
C) carbonic ions  
D) bicarbonate ions

When you inhale, the diaphragm?

- A) relaxes and moves upward  
B) contracts and moves downward  
C) relaxes and moves downward  
D) contracts and moves upward

With which other system do specialised respiratory systems most closely interface in exchanging gases between the cells and the environment?

- A) the skin  
B) the excretory system  
C) the circulatory system  
D) the muscular system

Which of the following is the respiratory surface in human respiratory system?

- A) larynx  
B) trachea  
C) bronchi  
D) alveoli

How is most of the oxygen transported in the blood?

- A) dissolved in plasma  
B) bound to haemoglobin  
C) as bicarbonate  
D) dissolved in water

The lateral walls of the chest cavity of man are composed of the:

- A) ribs  
B) intercostal muscles  
C) ribs, intercostal muscles and diaphragm  
D) ribs, intercostal muscles and diaphragm

Which of the following factors is the most effective in accelerating the rate of breathing in man?

- A) A lack of oxygen in the blood  
B) A lack of oxygen in the tissues  
C) An excess of carbon dioxide in the blood  
D) An excess of carbon dioxide in the tissues  
E) Which of the following changes will increase the rate of carbon dioxide excretion into the blood?

10. B

Chapter 14: Keys

5. B)

6. C)

7. A)

8. B)

9. C)

10. A)

11.

12. D)

13. C)

14. D)

15. B)

16.

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Chapter 15: Hemostasis

1. Excretion of hypotonic urine is associated best with the

- A) Glomerular capsule B) Proximal convoluted tubule
- C) Loop of the Henle D) Distal convoluted tubule

2. The walls of the \_\_\_\_\_ are made more or less permeable to water, depending on the need to conserve water:

- A) Ureter B) Urethra
- C) Fibrous capsule D) Collecting duct

3. Which of the following will cause a decrease in ADH production?

- A) Dehydration B) An increase in osmotic pressure of blood C) drinking water
- D) Abnormally low blood pressure

4. The function of glomerulus and Bowman's Capsule of the nephron is to:

- A) Reabsorb water into the blood
- b) Eliminate ammonia from the body
- C) Reabsorb salts and amino acids
- D) Filter the blood and capture the filtrate

5. In man, glucose is present in blood plasma but not in urine. This is because glucose molecules are:

- A) Actively transported from the proximal convoluted tubule to blood capillaries
- B) Oxidized to supply energy for ultrafiltration
- C) Stored in the kidney
- D) Too large to enter Bowman's Capsule

6. Evidence for glomerular filtration in the kidney could be obtained by comparing the sizes of the

1. C)	2. D)	3. C)	4. D)	5. A)	6. A)	7. D)	8. B)	9. B)	10. B)
-------	-------	-------	-------	-------	-------	-------	-------	-------	--------

Chapter 15: Keys

Chapter 16: Support and Movement

1. The atlas and axis vertebrae are located in:

- A) Lumbar region B) Cervical region
- C) thoracic region D) pelvic region

2. Hip joint and shoulder joints are examples of:

- A) Cartilaginous joint B) Synovial joint
- C) Hinge joint D) Ball and socket joint

3. Skeletal muscles contain dark band, which are isotropic, are called:

- A) A band B) I band

molecules present in Bowman's Capsule with those in the:

- A) Afferent blood vessel B) Collecting duct
- C) Loop of Henle D) Proximal tubule

The site and principal mechanism for the passage of glucose into the bloodstream in the human kidney is the:

- A) Collecting duct by active secretion
- B) Glomerulus, by selective reabsorption
- C) Glomerulus, by ultrafiltration
- D) Proximal convoluted tubule, by reabsorption

8. A drug reduces mitochondrial activity in kidney nephrons. Which chemical will be present in increased amounts in the urine?

- A) Ammonia B) Glucose
- C) Uric acid D) Urea

9. The main difference between endoderm and ectoderm is:

- A) How they conserve water
- B) Where from they get most of their body heat
- C) Whether they are warm or cold blooded
- D) Whether they live on land or in the water

10. The water content of human blood is regulated by ADH. In which part of the nephron does regulation occur?

- A) Ascending limb of loop of Henle
- B) Descending limb of loop of Henle
- C) Bowman's Capsule
- D) Proximal convoluted tubule

4. The acetabulum provides the articular surface for the:

- A) Humerus B) femur
- C) Pelvis D) Fibula

5. Scapula is connected with sternum by:

- A) Ribs B) Carpals
- C) Clavicle D) Atlas

which statement correctly describes the smooth muscles?

- A) Unstriated involuntary with spindle shape cells
- B) Unstriated involuntary with multinucleate cells
- C) Unstriated involuntary with uninnervated cells
- D) Striated involuntary with spindle shape cells

Thin myofilaments consist of:

- A) Actin, myosin, tropomyosin
- B) Actin, tropomyosin, troponin
- C) Actin, tropomyosin, fibrin
- D) Actin, myoglobin, troponin

Which of the following changes occur when skeletal muscle contracts?

- A) The A-bands shorten
- B) The I-bands shorten
- C) The Z-lines move further apart
- D) The H-zone becomes more visible

A human internal organs are protected mainly by the:

- A) Hydrostatic skeleton
- B) Axial skeleton
- C) Exoskeleton
- D) Appendicular skeleton

Arm and leg muscles are arranged in antagonistic pairs. How does this affect their functioning?

- A) It provides a backup if one of the muscles is injured
- B) One muscle of the pair pushes while the other pulls
- C) It allows the muscles to produce opposing movements
- D) It double the strength of contraction

### Chapter 16: Keys

B	3. A)	5. C)	7. C)	9. B)	11. D)	13. B)	15. C)	17. A)
D	4. B)	6. A)	8. B)	10. C)	12. A)	14. C)	16. D)	18. C)

### Chapter 17: Nervous Coordination

The function of the nerve gas is to inhibit the function of:

- A) Acetylcholine
- B) Atropine
- C) Cholinesterase
- D) Noradrenaline

The cell transmits impulses from the:

- A) Effector organ to the spinal cord
- B) Receptor cells to the effector organ
- C) Receptor cells to the spinal cord
- D) Spinal cord to the effector organ

Depolarization of an axon is produced by the movement of:

- A)  $\text{Na}^+$  into the axon and  $\text{K}^+$  out of the axon
- B)  $\text{Na}^+$  into the axon to bond with  $\text{K}^+$

### NUMS and National MDCAT by Ali Sudais

11. Which of the following bones in the human arm would correspond to the femur in the leg?

- A) Radius
- B) Tibia
- C) Fibula
- D) Humerus

12. At the distal end the femur forms knee joint with the proximal end of two parallel bones called:

- A) Tibia and fibula
- B) Radius and ulna
- C) Carpals and metacarpals
- D) Tarsal and metatarsal

13. Which of these is pyramidal?

- A) Slightly movable joint vertebrae
- B) Hinge joint-hip
- C) Synovial joint - elbow
- D) Immoveable joint-sutures in cranium

14. The deep infolding of the muscle fiber membrane is called:

- A) Sarcoplasmic reticula
- B) Z lines
- C) T-tubules
- D) Sarcomeres

15. Bone dissolving cells are called:

- A) Chondrocytes
- B) Osteoblasts
- C) Osteoclasts
- D) Osteocytes

16. Which of the following cartilage is found at the end of long bones?

- A) Calcified
- B) Fibrous
- C) Elastic
- D) Hyaline

17. At times ligaments are overstretched or torn. It is called:

- A) Sprain
- B) Dislocation
- C) Fracture
- D) Tension

18. Which ion is essential for muscle contraction?

- A) Na
- B) K
- C) Ca
- D) Cl



6. Motor neuron and dorsal horn S leg of a man. Which rapidly along nerves to the which they travel?  
 A) a nerve impulse is an all or none phenomenon  
 B) the nerves contain myelinated fibres

C) there is a high concentration of Na<sup>+</sup> ions in axons  
 D) there is a potential difference across the membranes  
 7. Where are neurotransmitter receptors located?  
 A) on the nuclear membrane  
 B) at node of Ranvier  
 C) on the postsynaptic membrane  
 D) in the myelin sheath

Chapter 17: Keys

1. A) | 2. D) | 3. A) | 4. D) | 5. A) | 6. D) | 7. C)

Chapter 18: Chemical Coordination

- Steroid hormones are secreted by:
  - A) The adrenal cortex
  - B) The gonads
  - C) The thyroid
  - D) Both A and B
- Examples of posterior pituitary hormones are:
  - A) FSH and LH
  - B) Prolactin and parathormone
  - C) Melatonin and prostaglandin
  - D) ADH and oxytocin
- The primary targets for FSH are cells in the:
  - A) Hypothalamus
  - B) Ovary
  - C) Thyroid
  - D) Pituitary
- Which of the following controls the activity of all others?
  - A) thyroid
  - B) Pituitary
  - C) Adrenal cortex
  - D) Gonads

- Which of the following have antagonistic (opposing) effects?
  - A) parathyroid hormone and calcitonin
  - B) glucagons and thyroxin
  - C) Growth hormone and epinephrine
  - D) Cortisone and ACTH
- Which of the following hormones has broadest range?
  - A) ADH
  - B) Oxytocin
  - C) TSH
  - D) Epinephrine
- The pancreas increases its output of insulin in response to:
  - A) an increase in body temperature
  - B) changing cycle of dark and light
  - C) a decrease in blood glucose
  - D) an increase in blood glucose

Chapter 18: Keys

1. D) | 2. B) | 3. B) | 4. B) | 5. A) | 6. D) | 7. D)

Chapter 19: Behaviour

- The responses of an organism to signals from its environment are its:
  - A) Behavior
  - B) Culture
  - C) Releaser
  - D) Motor programs
- A form of learning in which a young animal forms a strong attachment to a moving object (usually its parents) within a few hours of birth is:
  - A) Classical conditioning
  - B) Insight learning

- Imprinting
  - A) the division of labor is based on biologically determined castes
  - B) all adult members share labor equally
  - C) all adult members have the opportunity to reproduce
  - D) Reproduction is altered seasonally among adults
- In an insect society, such as the honey bee society:
  - A) the division of labor is based on biologically determined castes
  - B) all adult members share labor equally
  - C) all adult members have the opportunity to reproduce
  - D) Reproduction is altered seasonally among adults



Working to a mathematics problem is an example

1. of insight learning
  - A) an environment act
  - B) an instinct
  - C) an animal learns to ignore a repeated, irrelevant stimulus. This behavior is:
  - D) Reflex
2. The benefits of territoriality include:
  - A) classical conditioning
  - B) imprinting
  - C) insight learning
  - D) habituation
3. The benefits of territoriality include:
  - A) rights to defend a home range
  - B) increased reproductive success
  - C) monogamy
  - D) pair bonding

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7. The round dance of bees:
  - A) indicates that the food is close to the hive
  - B) communicates direction
  - C) results in bees flying long distances in all directions
  - D) indicates that food is distant from the hive
8. When *Drosophila* were exposed to a particular odor and electric shock at the same time, they started to avoid the odor. This is an example of:
  - A) Classical conditioning
  - B) Reasoning
  - C) Imprinting
  - D) Habituation

## Chapter 19: Keys

1. A) 2. C) 3. A) 4. A) 5. D) 6. A) 7. A) 8. A)

## Chapter 20: Reproduction

Seroli cells are found in:

1. Semiterous tubules
  - A) Seminal vesicle
  - B) Epididymis
  - C) Between interstitial cells
  - D) Epididymis

Fertilization of the ovum normally occurs:

2. In distal part of oviduct
  - A) in proximal part of oviduct
  - B) along the uterine wall
  - C) in distal part of oviduct
  - D) in proximal part of oviduct

Embryo implants in the

3. Endometrium
  - A) Myometrium
  - B) Endometrium of the uterus
  - C) Myometrium
  - D) Cervix

Spermatozoa are stored prior to emission and ejaculation in:

4. Epididymis
  - A) Epididymis
  - B) Seminal vesicle
  - C) Uterus
  - D) Prostate gland

The cervix is a portion of:

5. Uterus
  - A) Ovary
  - B) Vagina
  - C) Uterus
  - D) Fallopian tube

If pregnancy is established, ovulation and menstruation throughout gestation period)

## Chapter 20: Keys

1. A) 2. B) 3. C) 4. A) 5. C) 6. B) 7. B) 8. D) 9. A)

## Chapter 21: Development and Aging

How does a zygote differ from an ovum?

1. A) a zygote has more chromosomes
2. B) a zygote is smaller

3. C) a zygote is much larger
4. D) a zygote divides by meiosis

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- pected that several miscarriages. Her doctor does during the lining of the uterus to break down, as following menstruation, terminating her pregnancy. Treatment with which of the
- A) oxytocin
  - C) follicle stimulating hormone?
  - D) progesterone
  - B) luteinizing hormone
3. In human development, ectoderm cells migrate through the primitive streak to form:
- A) endoderm
  - C) the chorion
  - B) mesoderm
  - D) the yolk sac
4. The process by which a tissue causes another tissue to differentiate is called:
- A) gastrulation
  - C) cleavage
  - B) Metamorphosis
  - D) induction

5. Which of the following has three germ layers?
  - A) embryonic disc
  - C) gastrula
  - B) blastula
  - D) trophoblast

Which of the following consists of both longitudinal and transverse folds?

  - A) umbilical cord
  - C) amnion
  - B) placenta
  - D) allantois
6. Identical twins result from the fertilization of:
  - A) one ovum by one sperm
  - B) one ovum by two sperms
  - C) two ova by two sperms
  - D) two ova by one sperm

Which of the following are mismatched?

- A) Endoderm; lining of the digestive tube
- B) Ectoderm; circulator system
- C) Mesoderm; notochord
- D) Mesoderm; reproductive

### Chapter 21: Keys

1. B) | 2. D) | 3. B) | 4. D) | 5. C) | 6. B) | 7. A) | 8. D)

### Chapter 22: Inheritance

1. Mendel's law of independent assortment can be demonstrated by:
  - A) Test cross
  - C) Monohybrid cross
  - B) Back cross
  - D) Dihybrid cross
2. Investigators do a dihybrid cross between two heterozygous and get about a 3:1 ratio among the offspring. The reason must be due to:
  - A) Polygenes
  - C) Linked genes
  - B) Pleiotropic genes
  - D) Epistatic gene
3. Whether an allele is dominant or recessive depends on:
  - A) How common the allele is relative to other alleles
  - B) Whether it is inherited from the mother or the father
  - C) Which chromosome it is on
  - D) Whether it shows expression in heterozygous state or not
4. All the offspring of a white hen and a black rooster are grey. The simplest explanation for this pattern of inheritance is:
  - A) Linkage
  - C) Independent assortment
  - B) sex linkage
  - D) incomplete dominance
5. A man who has types B blood and a woman who has type A blood could have children of which of the following phenotypes?
  - A) four
  - B) three
  - C) D and E; which occupy tightly linked loci
  - D) MN blood group

6. A heterozygous red-eyed female *Drosophila* mated with a white-eyed male would produce:
  - A) red-eyed females and white males in the F<sub>1</sub>
  - C) all white-eyed females and half red and half white-eyed males in the F<sub>1</sub>
  - B) white-eyed females and red-eyed males in the F<sub>1</sub>
  - D) half red and half white-eyed female as well as male in the F<sub>1</sub>
7. When mothers anti-RH negative antibodies act through placenta into blood circulation of fetus they start of RBC of the fetus.
  - A) Plasmolysis
  - C) Hemolysis
  - B) Crenation
  - D) deplasmolysis
8. All chromosomes other than sex-chromosomes are called:
  - A) Autosome
  - C) polysome
  - B) mesosome
  - D) lysosome
9. If a man of M blood group marries a woman of N blood group all their children will have:
  - A) M blood group
  - C) O blood group
  - B) N blood group
  - D) MN blood group
10. Rh blood group system is encoded by three genes C, D and E; which occupy tightly linked loci:
  - A) four
  - B) three
  - C) D and E; which occupy tightly linked loci
  - D) MN blood group

13. A woman with albinism is a recessive gene. A woman with albinism marries an albino man. The proportion of her progeny is:
- all normal
  - all albino
  - normal 1 albino
  - normal 1 albino
14. Phenomena of an allele of one gene suppressing the activity of allele of another gene is called:
- Dominance
  - Epistasis
  - Suppression
  - Inactivation
15. If red eyed (dominant) fly is mated with white eyed (recessive) fly, the ratio of red to white eyed in F<sub>2</sub> generation would be:
- 3:1
  - 2:2
  - 1:1
  - 2:1

Chapter 22: Keys

- B
- B
- B
- D
- A
- C
- D
- C
- B
- D
- B
- A

Chapter 23: Chromosomes and DNA

1. Chromosomes are made of:
- DNA Pectin
  - DNA + H-stone
  - DNA + DNA
  - DNA only
2. In his work with pneumonia-causing bacteria and mice, Griffith found that:
- Heat-killed pathogenic cells caused pneumonia
  - Some substance from pathogenic cells was transferred to non pathogenic cells, making them pathogenic.
  - The polysaccharide coat of bacteria caused pneumonia
  - Bacteriophage injected DNA into bacteria
3. Biochemist isolates and purifies molecules needed for DNA replication. When DNA is 'added', replication occurs, but each DNA molecule consists of a normal strand paired with numerous segments of DNA a few hundred nucleotides long. What has probably been left out of the mixture?
- DNA polymerase
  - DNA ligase
  - Okazaki fragments
  - Primase
4. What is the basis for the difference in how the leading and lagging strands of DNA molecules are synthesized?
- The origins of replication occur only at the 5' end
  - DNA ligase worked only in the 5' direction
  - Polymerase can only work on one strand at a time
  - DNA polymerase can join new nucleotides only to the 3' end of a growing strand

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14. Blood group in human beings are controlled by:
- 4 alleles in which A is dominant
  - 3 alleles in which A is dominant
  - 3 alleles in which A and B are co dominant and I is recessive
  - 3 alleles in which none is dominant
15. The anticodon of a particular tRNA molecule is:
- complementary to the corresponding triplet in mRNA
  - complementary to the corresponding triplet tRNA
  - the same of the tRNA bonds to specific amino acid
  - Catalytic, making the tRNA

5. Synthesis of a new DNA strand usually begins with:
- an RNA primer
  - DNA ligase
  - a DNA primer
  - an Okazaki fragment

6. A sub metacentric chromosome has centromere:
- in the center of chromosome
  - near an end of chromosome
  - slightly away from the center of a chromosome
  - at the end of a chromosome

7. The elongation of the leading strand during DNA synthesis:
- progresses away from the replication fork
  - occurs in the 3' — 5' direction
  - produces Okazaki fragments
  - depends on the action of DNA polymerase

8. Whose pioneering work on the gene used the bacteriophage to show that DNA was the part of this virus which went into the bacterial cell for replication?
- Watson and Crick
  - Beadle and Tatum
  - Hershey and Chase
  - Hershey and Chase

9. If you want to label uridine acids but not DNA, which of the following radioactive isotopes would you use?
- <sup>32</sup>S
  - <sup>32</sup>P
  - <sup>14</sup>C
  - <sup>35</sup>S

10. Semi conservative replication refers to the fact that:



11. In eukaryotic cells, transcription cannot begin until:
- the two DNA strands have completely separated and exposed the promoter
  - the tRNA
  - Certain base pair with specific bases
  - One DNA strand enters the bacterial cell
  - Only the DNA of the bacteriophage enters the molecule

12. The anticodon of a particular tRNA molecule is:
- Complementary to the corresponding mRNA
  - Complementary to the corresponding tRNA
  - The pair of the tRNA bonds to specific amino acids
  - Catalytic, making
  - several transcription factors have been isolated
  - the tRNA introns are removed from the sequence
  - DNA nucleases have isolated the "hot spot"

### Chapter 23 : Keys

1. C | 2. B | 3. B | 4. D | 5. A | 6. C | 7. D | 8. C | 9. B | 10. D | 11. B | 12. A

### Chapter 24: Evolution

1. Using the Hardy-Weinberg Principle, which expression represents the frequency of the homozygous recessive genotype?
  - P<sup>2</sup>
  - 2Pq
  - q<sup>2</sup>
  - d q
2. The process of and generate variation, and produces adaptation to the environment.
  - sexual recombination — natural selection — mutation
  - genetic drift mutation sexual recombination.
  - mutation sexual recombination — natural selection
  - mutation natural selection — genetic drift
3. Natural selection is sometimes describe as survival of the fittest. Which of the following most accurately measures an organism's fitness?
  - its mutation rate
  - how many fertile offspring it produces.
  - its ability to withstand environmental extremes
  - how much food it is able to make or obtain.
4. Which of the following is a true statement about Charles Darwin?
  - he was the first to discover that living things can change, or evolve.
  - he based his theory on the inheritance of acquired characteristics.
  - he worked out the principle of population genetics.
  - he proposed natural selection as the mechanism of evolution.
5. In science the term theory generally applies to an idea that:
  - is a speculation lacking supportive experiments.

6. The smallest biological unit that can evolve over time is:
  - a specie
  - an individual organism
  - an ecosystem
  - a population
7. Which of the following ideas is common to both Darwin's and Lamarck's theories of Evolution?
  - adaptation results from different reproduction success.
  - evolution drives organisms to greater and greater complexity.
  - evolutionary adaptation results from interactions between organisms and their environment.
  - the fossil record supports the view that species are fixed)
8. Which of the following pairs of structures is best likely to represent homology?
  - the wings of a bat and the forelimbs of a human
  - The hemoglobin of a baboon and that of a gorilla
  - the brain of a cat and that of a dog
  - the wings of a bird and those of an insect
9. All organisms share the same genetic code. The commonality is evidence that:
  - evolution is occurring now.
  - convergent evolution has occurred)
  - all organisms are descended from a common ancestor.
  - evolution occurs gradually from.





Ligase ---enzyme that cuts DNA, creating the sticky ends of restriction fragments.

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3. Plants are more readily manipulated by genetic engineering than are animals because:
  - A) plant genes do not contain intron
  - B) plant cell have large nuclei
  - C) a somatic plant cell can often give rise to a complete plant
  - D) genes can be inserted into plant cells by microinjection
4. A paleontologist has recovered a bit of tissue from the 400 year old preserved skin of an extinct bird. The researcher would like to compare DNA from the sample with DNA from living birds. Which of the following would be most useful for increasing the amount of the bird DNA available for testing?
  - A) a RFLP analysis
  - B) polymerase chain reaction (PCR)
  - C) Electroporation
  - D) Southern hybridization
5. Which of the following sequences in double-stranded DNA is mostly likely to be recognized as a cutting site for a restriction enzyme?
  - A) AAGG TTCC
  - B) AGTC TCAG
  - C) GGCC CCGG
  - D) ACCA TGGT
6. A Plasmid:
  - A) is used as DNA vector
  - B) is a type of bacteriophage
  - C) is a type of cDNA
  - D) is a retrovirus
7. DNA molecules with complementary sticky ends associate by:
  - A) Covalent bond
  - B) Hydrogen bond
  - C) Ionic bond
  - D) disulphide bond
8. Which technique rapidly replicates specific DNA fragments without cloning?
  - A) gel electrophoresis
  - B) cDNA libraries
  - C) Polymerase chain reaction
  - D) PCR technique
9. The PCR technique polymerase:
  - A) Heat resistance DNA polymerase

## Chapter 26 : Keys

10. A cDNA clone contains:
  - A) Introns
  - B) Exons
  - C) Anticodon
  - D) mRNA
11. The Dideoxynucleotides (ddATP, ddTTP, ddCTP and ddGTP) are improvement in DNA sequencing because they:
  - A) cause premature termination of growing DNA strand
  - B) are used as prime
  - C) cause the DNA fragments that contain them to migrate more slowly through the gel.
  - D) are not affected by high temperature.
12. If eukaryotic DNA contains five cleavage sites for a particular restriction enzyme, how many fragments will be produced upon complete digestion of the DNA with that enzyme:
  - A) 2 B) 4 C) 6 D) None
13. Gel electrophoresis separates nucleic acid on the basis of difference:
  - A) length (molecular weight)
  - B) charge
  - C) on c/cotide sequence
  - D) relative proportion of adenine and guanine
14. The Ti plasmid carried by Agrobacterium tumefaciens, is especially useful for introducing genes into a:
  - A) bacteria
  - B) plant
  - C) animal
  - D) yeast
15. A Genomic DNA library:
  - A) Represents the entire DNA in a specific chromosome
  - B) is made using reverse transcriptase.
  - C) is stored in a collection of recombinant bacteria
  - D) is a DNA copy of mature mRNAs.
16. Which of the following is highly polymorphic molecular marker which is useful in DNA fingerprinting?
  - A) a short tandem repeats
  - B) Palindromic DNA sequence
  - C) Cloned DNA sequence
  - D) cosmid cloning

1. B	3. B	5. C	7. B	9. A	11. C	13. B	15. A
2. C	4. A	6. A	8. D	10. A	12. A	14. C	

- The artificial active immunity is achieved by injecting small amount of antigen called:
- A) Antibodies
  - B) Toxin
  - C) Vaccine
  - D) Serum
- polio virus lives in the
- A) Mouth and throat
  - B) Stomach and intestine
  - C) Mouth and intestine of man
  - D) Throat and intestine
- Measles is an infectious viral disease that occurs most often in:
- A) late winter and autumn
  - B) late winter and summer
  - C) late winter and spring

- D) winter and rainy days
5. The best way to prevent a tetanus is:
- A) antibiotic
  - B) medicine
  - C) vaccination
  - D) cleanses
6. Hybridization in plants, is the technique of introducing desirable species into a hybrid by means of:
- A) Pollination
  - B) Selection
  - C) Emasculation
  - D) Micro propagation
7. Which of the following is/are the method of crop improvement?
- A) Selection
  - B) Emasculation
  - C) polyploid breeding
  - D) all of these

Chapter 27: Keys

1. C)      2. D)      3. C)      4. C)      5. A)      6. D)

# FBISE CHEMISTRY MCQS

## CHAPTER 1: STOICHIOMETRY

- How many molecules are there in one mole of  $H_2O$ ?  
 A)  $6.02 \times 10^9$   
 C)  $1.084 \times 10^{18}$   
 B)  $6.023 \times 10^{23}$   
 D) None of these
- A flask contains  $500 \text{ cm}^3$  of  $SO_2$  at STP. The flask contains  
 A) 40 g  
 C) 50 g  
 B) 100 g  
 D) none of these
- A necklace has 6g of diamond in it what are the numbers of atoms in it?  
 A)  $6.02 \times 10^{23}$   
 C)  $1.033 \times 10^{23}$   
 B)  $12.04 \times 10^{23}$   
 D)  $3.01 \times 10^{23}$
- What is the mass of aluminum in 204 g of the aluminum oxide,  $Al_2O_3$ ?  
 A) 26g  
 C) 54 g  
 B) 27 g  
 D) 108 g
- The reactant which is consumed earlier and gives least quantity of product is called.  
 A) Reactant  
 C) Limiting reactant  
 B) Spectrometer  
 D) Spectroscopic amount
- Which one of the following compounds contains the highest percentage by mass of nitrogen?  
 A)  $NH_3$   
 C)  $NO$   
 B)  $N_2H_4$   
 D)  $NH_4OH$
- Vitamin-A has a molecular formula  $C_{20}H_{30}O$ . The number of vitamin-A molecules in 500 mg of its capsule will be  
 A)  $6.02 \times 10^{23}$   
 C)  $3.01 \times 10^{22}$   
 B)  $1.05 \times 10^{23}$   
 D)  $3.01 \times 10^{24}$
- When one mole of each of the following is completely burnt in oxygen which will give the largest mass of  $CO_2$ ?  
 A) Carbon Monoxide  
 C) Ethane  
 B) Diamond  
 D) Methane
- One mole of ethanol and one mole of ethane have  
 A) Mass  
 C) Number of electron  
 B) Number of Atoms  
 D) Number of molecules
- Methane reacts with down to form  $H_2$  and  $CO$  as shown below.  
 $CH_4 + H_2O \rightarrow CO + 3H_2$   
 (g) (g) (g) (g)

- What volume of  $H_2$  can be obtained from 100 cm<sup>3</sup> of methane at the standard temperature and pressure?
- A) 300 cm<sup>3</sup>  
 C) 150 cm<sup>3</sup>  
 B) 200 cm<sup>3</sup>  
 D) 100 cm<sup>3</sup>
11. The Avogadro's constant is the number of  
 A) Atoms in 1g of Helium  
 B) Molecules in 35.5g of Chloride  
 C) Ions in 24g of Mg  
 D) Atoms in 24g of Al
12. How many moles of oxygen are needed for the complete combustion of two moles of butane?  
 A) 2  
 C) 10  
 B) 8  
 D) 13
13. If four moles of  $S(8)$  are oxidized to  $SO_2$ , how many moles of oxygen molecules are required.  
 A) 0.5  
 C) 1.5  
 B) 1.0  
 D) 2.0
14. The relative atomic mass of Chlorine is 35.5. What is the mass of 2 moles of Chlorine gas?  
 A) 142g  
 C) 35.5g  
 B) 71g  
 D) 18.75g
15. Which of the following statements is incorrect?  
 A) One of carbon gas contains one mole of atoms  
 B) One of Nitrogen gas contains one mole of molecules of  $N_2$   
 C) One of a 10 Mole dm<sup>3</sup> solution of NaCl contains one mole of chloride ions  
 D) None of above
16. One mole of propane has the same  
 A) Number of molecules as one mole of methane ( $CH_4$ )  
 B) Number of C-atoms as in one mole of butane ( $C_4H_{10}$ )  
 C) Mass is half a mole of hexane ( $C_6H_{14}$ )  
 D) Number of molecules as in one mole of ethane ( $C_2H_6$ )
17. What is the mass of one mole of Iodine Molecules?  
 A) 254 g  
 C) 106 g  
 B) 74 g  
 D) 127 g
18. What volume of  $S(8)$  at room temperature and pressure is produced on heating 9.7g of Iron Sulphide ( $FeS$ )? If reaction takes place as follows  
 $2ZnS + 3O \rightarrow 2ZnO + 2SO_2$   
 A) 1.2 dm<sup>3</sup>  
 C) 3.6 dm<sup>3</sup>  
 B) 2.4 dm<sup>3</sup>  
 D) 4.8 dm<sup>3</sup>



3. D	5. C	7. E	9. D	11. B	13. D	15. D	17. A
4. D	6. B	8. C	10. A	12. D	14. A	16. A, D	18. E

Chapter 2: Atomic Structure

- Wave mechanical model of the atom depends upon
  - the Brooker's concept of duality
  - Heisenberg's uncertainty principle
  - Schrodinger's wave equation
  - All of the above
- For which species Bohr's theory does not apply
  - H
  - He
  - Li
  - Be
- From the discharge tube experiment, it is concluded that
  - Mass of a proton is sin fraction of  $M_e$  is compared electrons
  - Nucleus contains positive charge
  - Positive rays are heavier than protons
  - When an electron of charge ' $e$ ' and mass ' $m$ ' moves with velocity ' $v$ ' about the nuclear charge  $Ze$  in the circular orbit of radius ' $r$ ', the P.E. of electron is given by
    - $Ze^2/r$
    - $Ze^2/r^2$
    - $Ze^2/r$
    - $Ze^2/r^2$
- Which of following quantum numbers is not obtained from Schrodinger wave equation?
  - Principal quantum number
  - Azimuthal quantum number
  - Magnetic quantum number
  - Spin quantum number
- Electronic configuration of species  $M$  is  $1s^2 2s^2 2p^1 3s^2 3p^4 3d^1$  and its atomic weight is 56 number of neutrons in the nucleus of species  $M$  is of

Answer Key of Chapter 2:

2. D
3. B
4. A
5. D
6. D
7. D
8. C
9. D
10. A, C
11. B: The first line is  $3 \rightarrow 2$ , second line is  $4 \rightarrow 2$  and third line is  $5 \rightarrow 2$ .

Chapter 3: Theories of Covalent Bonding and Shapes of Molecules

- The bond energies of  $F_2$ ,  $Cl_2$ ,  $Br_2$ , and  $I_2$  are 37, 58, 46 and 36 kcal respectively. The strongest bond formed is in

9. Which one of the following d-orbitals is not correct?

A) Rydberg's constant and wave number have same unit

B) Lyman series of hydrogen spectrum occurs in the ultraviolet region

C) The angular movement of the electron in the ground state of hydrogen atom is equal to  $h/2\pi$ .

D) The radius of first Bohr orbit of hydrogen atom is  $2.11 \times 10^{-8} \text{ cm}$

10. Which one of Si following is not isoelectronic pair?

A)  $Mg^{2+}$ ,  $Be^{2+}$

B)  $N_2$ ,  $O_2$

C)  $N$ ,  $O$

D)  $F^-$ ,  $Al^{3+}$

11. The third line in Balmer series corresponds to an electronic transfer between which Bohr's orbit in hydrogen

A)  $5 \rightarrow 3$

B)  $5 \rightarrow 2$

C)  $4 \rightarrow 3$

D)  $4 \rightarrow 2$

- Two atoms is calculated from the difference between their
1. A) Ionic  
C) Electron affinity  
The geometry of  $PF_5$  molecule is  
A) Planar  
C) Trigonal bipyramidal
  2. B) Square planar  
D) Tetrahedral
  3.  $sp^3$  Hybridization is important in describing the bonding in  
A)  $NH_4^+$   
C)  $H_2O^+$
  4. Greater the dipole moment  
A) Greater the ionic character  
B) Lesser is the polarity  
C) Smaller is the ionic character  
D) None
  5. H-O-H bond in water is  $104^\circ$  and not  $109.28^\circ$  because of  
A) High electronegativity of oxygen  
B) Bond Pair-Bond pair repulsion  
C) Lone pair-Lone pair repulsion  
D) Lone pair-Bond pair repulsion

Answer Key of Chapter 3:

1. B	2. B	3. C	4. B	5. A	6. D	7. C	8. B	9. A	10. B
------	------	------	------	------	------	------	------	------	-------

Chapter 4 - State of Matter (Gases)

Choose the correct answer (MCQs)

1. When compressed hydrogen is allowed to expand rapidly, it causes  
A) Cooling  
C) Liquefaction  
760 torr are equal to Pascal.  
A) 760 Pascal  
C) 1.01325 Pascal
2. The number of molecules of 56 g of  $N_2$  are  
A) Equal to  
C) Greater than
3. According to the Kinetic theory of gases, the molecular collisions are elastic. Such collisions cause  
A) No energy change  
C) high energy change
4. What volume of gas would one mole of hydrogen occupy at S.T.P?  
A) 11.2 dm<sup>3</sup>  
C) 33.6 dm<sup>3</sup>
5. Low energy change  
D) none of these
6. 22.4 dm<sup>3</sup>  
D) 44 dm<sup>3</sup>

7. A diatomic molecule has a dipole moment of 1.1 D. If its bond distance is 1.0 Å. What fraction of electric charge exists on each atom?  
A) 12% of e  
C) 25% of e
8. What is the characteristic of n bond?  
A)  $\pi$  bond is formed when a sigma bond exists  
B)  $\pi$  bond is formed from hybrid sp orbitals  
C) bond is formed by the overlapping of p and d orbitals  
D)  $\pi$  bond is formed from lateral overlapping of atomic orbitals
9. In the formation of  $N_2^+$  from  $N_2$ , the electron is removed from.  
A)  $\sigma_{2s}$  orbital  
C)  $\pi_{2p}$  orbital
10. According to VSEPR theory the most probable shape of the molecule having 4 electron pairs around the central atom is  
A) Hexagonal  
C) Octahedral
11. B) Tetragonal  
D) Linear

6. According to Graham's Law of diffusion, the rate of diffusion of  $H_2$  and  $O_2$  has the ratio  
A) 1:4  
C) 4:1
7. Deep sea diver's tank contains  
A) 96%  $N_2$  + 4%  $O_2$   
C) 50%  $N_2$  + 50%  $O_2$
8. In S.I units, the value of R is  
A) 8.3143 Nm K<sup>-1</sup> mole<sup>-1</sup>  
C) 0.0821 dm<sup>3</sup> atm K<sup>-1</sup> mole<sup>-1</sup>
9. According to Kinetic Molecular theory K.E of molecules increase when they  
A) Are mixed with other molecules at low temperature  
B) Are frozen into solid  
C) Are condensed into solid  
D) Are melted from solid to liquid state.
10. Which gas is more ideal at S.T.P?  
A)  $SO_2$   
C)  $NH_3$
11. On heating direct conversion of a solid into gas is called:  
A) Sublimation  
C) Diffusion
12. In which of the following states of matter is the particles most disordered?  
A) Solid  
C) Liquid
13. When steam is cooled, it changes into water. This process is called:  
A) Condensation  
C) Evaporation
14. The particles of a solid are held together by:  
A) Weak forces  
C) Strong forces
15. Which of the following is not a gas?  
A) Oxygen  
C) Nitrogen

1. A) evaporation

B) sublimation

C) Diffusion

12. In which of the following are the particles the most disordered.

A) Water

B) steam at 100°C

C) Impure water at 102°C

D) water at 0°C

13. When steam condenses, the particles

A) Shrink to a smaller size

B) Lose energy to their surroundings

C) Move further apart

D) Vibrate about fixed positions.

14. The particles of a gas can be described as

A) Only moving outwards in direction

B) vibrating about defined position

C) Keeping up words

D) moving randomly in all directions

15. Which of these changes would speed up the rate of diffusion the most?

A) Mass of Particle

Temperature of Surroundings

1. Decrease

Decrease

2. Decrease

Increase

3. Increase

Increase

4. Increase

Decrease

16. Which of the following gases has the lowest density under room conditions?

A) CO

B) N<sub>2</sub>

C) Ne

D) NH<sub>3</sub>

E) O<sub>2</sub>

### Answer Key of Chapter 4:

1. A	3. A	5. B	7. D	9. D	11. B	13. B	15. B	17. D	19. A
2. B	4. A	6. C	8. B	10. D	12. B	14. D	16. D	18. E	20. C

### CHAPTER 5: State of Matter (Liquids)

1. Van der Waal's forces are effective.

A) At long distance

B) Both at long as well as short distance

C) Only at short distance

D) Independent of distance

2. Which one of the following forces are also called London forces?

A) Ion-dipole forces

B) Dipole-induced dipole forces

C) Dipole-dipole forces

D) Dispersion forces

3. Which of the following two halogens are gases at room temperature?

A) Fluorine and Iodine

B) Chlorine and Bromine

C) Fluorine and Chlorine

D) Iodine and Bromine

4. The intermolecular forces are of

A) two types

B) three types

C) four types

D) five types

5. Thermistor is an instrument which

A) Increases the temperature

B) Decreases the temperature

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17. Which statement provides the best evidence that "random motion" may exist as tiny particles moving at

A) Many elements conduct electricity

B) air can be readily compressed

C) A small mass of water produces a much larger volume of steam

D) If a bottle of ether is opened, the smell is quickly detected in all parts of the room

18. Which of the following is an example of diffusion?

A) Bubbles rising in a beaker of boiling water

B) Steam condensing on a cold window

C) Water spreading out on the surface of a table

D) Hot air rising above a burning candle

19. When a large beaker full of N<sub>2</sub> is inverted over a porous pot containing C (s), the water level in the specified apparatus does not change. What is the reason for this?

A) The two gases have equal density

B) Nitrogen is an unreactive gas.

C) Both gases are diatomic.

D) Both gases are soluble in H<sub>2</sub>O.

20. Which statement explains why the compounds propane and C<sub>2</sub>H<sub>6</sub> diffuse at the same rate?

A) They are both gases.

B) Their molecules contain carbon

C) They have the same relative molecular mass.

D) Both are denser than air.

E) Both molecules contain covalent bonds



10. The intermediate phase lying between the solid phase and the normal liquid phase is called  
A) Crystalline solid B) Liquid crystals  
C) Mesogens D) Crystal lattice
11. In which of the following are the particles the most disordered?  
A) Water at 100°C B) Steam at 100°C  
C) Impure water at 102 °C D) Water of 10°C
12. Which of these statements best supports the file that matter is made up of particles?  
A) I liquids always fit the space available to them  
B) liquids are easy to compressible  
C) 1 cm<sup>3</sup> of water protects nearly 100 cm<sup>3</sup> of ocean  
D) If a bottle of perfume is opened the smell spread quickly
13. Which of these processes involve a weakening of the attraction between particles?  
A) Condensation B) Freezing  
C) Crystallization D) Evaporation
14. A liquid is thought to be pure ethanoic acid (acetic acid), which of the following is the best way to test its purity?  
A) Measure its BP  
B) React it with ethanol  
C) Burn it completely in oxygen  
D) Dehydrate it with concentrated H<sub>2</sub>SO<sub>4</sub>
15. A flask contains the liquid chloroform and water. They are separated using a separating funnel, which conclusion can be from this observation alone.  
A) Chloroform and water have different relative molecular masses  
B) Chloroform and water have different boiling points  
C) Chloroform has a higher density than water  
D) Chloroform and water do not mix
16. Which of the following is the best method of obtaining wax from ink?  
A) Distillation B) Filtration  
C) Freezing D) Chromatography
17. To help diagnose illness, doctors often need to know which amino acids are present in blood or urine. Which method is common by used to separate and identify amino acids?  
A) Chromatography B) Distillation  
C) Recrystallization D) Filtration
18. Which of the following is not a physical property of a substance?  
A) Boiling point B) Melting point  
C) Density D) Solubility

Answer Key of Chapter 5:

1. C	3. C	5. C	7. B	9. A	11. B	13. D	15. D	17. A
2. D	4. D	6. A	8. A	10. B	12. C	14. A	16. D	

Chapter 6 - State of Matter (Solids)

1. The temperature at which two or more than two types of crystals exist in equilibrium is called.  
A) Melting Point B) Boiling point.  
C) Transition temperature D) Freezing point.
2. The solids in which atoms, ions or molecules have random non-repetitive three-dimensional arrangements are termed as:  
A) Crystals B) Glasses  
C) Alloys D) Amorphous
3. The nature of bond in diamond is  
A) Ionic B) Covalent  
C) Molecular D) Metallic
4. Crystal lattice is an arrangement of particles in  
A) One dimension B) Two dimensions  
C) Three dimensions D) Four dimensions
5. Lattice energy is also called  
A) Crystal energy B) Ionization energy  
C) Energy of affinity D) Bond Energy
6. When gaseous ions are allowed to form a crystal energy  
A) is evolved B) is absorbed



11.5. All Series sometimes absorbed and sometimes released

1. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

2. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

3. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

4. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

5. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

6. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

7. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

8. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

9. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

10. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

11. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

12. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

13. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

14. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

15. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

16. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

17. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

18. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

19. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

20. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

21. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

1. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

2. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

3. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

4. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

5. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

6. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

7. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

8. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

9. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

10. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

11. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

12. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

13. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

14. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

15. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

16. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

17. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

18. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

19. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

20. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

21. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

22. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

23. A crystal has both atomic ratio 1:1 in their  
crystals such property is  
D) Allotropy

# Chapter 7 - Chemical Equilibrium

## Answer Key of Chapter 6:

1. B	2. B	3. A	4. B	5. A	6. B	7. A	8. A	9. A	10. A	11. B	12. D	13. C	14. A	15. D	16. B	17. C
------	------	------	------	------	------	------	------	------	-------	-------	-------	-------	-------	-------	-------	-------

1. B

2. B

3. A

4. B

5. A

6. B

7. A

8. A

9. A

10. A

11. B

12. D

13. C

14. A

15. D

16. B

17. C

2A<sub>g</sub> + B<sub>g</sub> ⇌ 3C<sub>g</sub>

We can write

A) K<sub>c</sub> = K<sub>p</sub>

B) K<sub>c</sub> = 0

C) K<sub>c</sub> = 1

D) K<sub>c</sub> = -1

E) K<sub>c</sub> = 0

When a catalyst is added to an equilibrium mixture, it decreases

A) Reverse reaction

B) Forward reaction

C) Concentration of reaction mixture

D) Total pressure

E) None of these

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Compound is  $[X]^{2+}$  the chemical formula of

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6.  $NaCl$  can be purified by passing  $HCl$  gas through the solution of  $NaCl$
- A) Dilute  
B) Concentrated  
C) Hot  
D) Cold

7.  $Kc \approx Kr$ , when an is equal to
- A) Zero  
B) 1  
C) -1  
D) 2

8. Consider the following reaction:  
 $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$   $\Delta H^\circ = -198 kJ/mol$   
sulphur trioxide can be increased
- A) increasing Pressure  
B) increasing temperature  
C) Adding catalyst  
D) increasing concentration of oxygen

### Answer keys of chapter 7:

- |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| 1. D | 2. C | 3. C | 4. E | 5. B | 6. B | 7. A | 8. B |
|------|------|------|------|------|------|------|------|

### Chapter 8 - Acids, Bases and Salts

Choose the correct answer (MCQs).

Encircle the correct answer in each case:

- Water cannot act as:
 

A) Lewis acid  
B) Lewis base  
C) Bronsted acid  
D) Bronsted base
- pH of 0.01M HCl solution is:
 

A)  $10^-$   
B)  $10^+$   
C) 2.0  
D) 1.0
- An aqueous solution of ammonium chloride is:
 

A) Basic  
B) Acidic  
C) Neutral  
D) Amphoteric
- An aqueous solution of which compound is basic:
 

A) Ammonium nitrate  
B) Calcium chloride  
C) Ammonium acetate  
D) Potassium carbonate
- Which statement about acids is not correct? An acid:
 

A) Contains hydrogen ions in solution  
B) Contains oxygen  
C) Gives off carbon dioxide from a carbonate  
D) If a liquid has a pH of 7.
- If a liquid has a pH of 7.
 

A) It must be colourless  
B) It has boiling point of  $100^\circ C$ .  
C) It must be a solution  
D) It must be neutral.
- When air is bubbled through pure water, the pH is lowered from 7.0 to 5.6, which gas in the air is responsible for this change.
 

A) Argon  
B) Carbon dioxide  
C) Nitrogen  
D) Oxygen
- Which of the following oxides is classified incorrectly?
 

A) Zinc oxide ( $ZnO$ ) amphoteric  
B) Carbon dioxide ( $CO_2$ ) acidic  
C) Carbon monoxide neutral  
D) Carbon monoxide neutral

9. If 25 cm<sup>3</sup> of 1 mol. dm<sup>-3</sup> nitric acid is added to 25 cm<sup>3</sup> of 0.5 potassium hydroxide solution, the pH of the resulting solution would be
- A) 5  
B) 7  
C) 9  
D) 14

10. If dry citric acid crystals are placed on dry blue paper they will
- A) turn yellow  
B) turn green  
C) turn red  
D) remain unchanged

11. A base is a substance which will neutralize an acid which of these substances is not a base:
- A) Aqueous ammonia  
B) Copper oxide  
C) Potassium carbonate  
D) Sodium carbonate

12. A strong acid:
 

A) is always partially ionized when in solution  
B) is always fully ionized when in solution  
C) Always decomposes carbonates  
D) Always contains oxygen

13. Which one of the following oxides dissolves in water to form an acidic solution?
 

A)  $MgO$   
B)  $Na_2O$   
C)  $SO_2$   
D)  $SiO_2$

14. When crystals of copper sulphate are heated, the colour changes from blue to white. This is caused by:
 

A) Loss of water only  
B) Loss of water and oxygen  
C) Reaction with  $CO_2$  in the air  
D) Loss of water, sulphur dioxide and oxygen

15. The oxide of a metal was found to react with  $HCl$  along aqueous  $NaOH$  solution. Which of the following is the best description of the oxide?
 

A) Acidic  
B) Amphoteric  
C) Basic  
D) Neutral

1) Basic  
2) Neutral  
3) Acidic  
4) None of these

Which one of the following statements must be true of an acid salt?  
a) It can only be formed from a weak acid  
b) It is the only salt formed from a dibasic acid  
c) It is the salt of a non-metal  
d) It contains hydrogen that is replaceable by a metal

(One mole of each of the following compounds was dissolved in water to make one dm<sup>3</sup> of solution. Which of the solutions would have the lowest pH value?)  
A)  $\text{NH}_3$   
B)  $\text{CH}_3\text{COOH}$   
C)  $\text{NaCl}$   
D)  $\text{NaOH}$   
E)  $\text{H}_2\text{SO}_4$

Which salt could be obtained as the insoluble product of a reaction between a dilute acid and an aqueous salt?

Answer Key chapter 8:

1. A	2. B	3. B	4. D	5. B	6. D	7. B	8. D	9. B	10. D	11. C	12. B	13. C	14. A	15. B	16. D	17. E	18. A	19. C	20. B
------	------	------	------	------	------	------	------	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Chapter 9 - Chemical Kinetics

1. The rate of a reaction as the reaction proceeds.  
A) Increases  
B) Decrease  
C) Remains the same  
D) May increase or decrease

The unit of the rate constant in the same as that of the rate of reaction in order reaction.  
A) First  
B) Second  
C) Third  
D) Zero

For the reaction  
 $2A + B \rightarrow C$   
The rate law of the reaction is,  
A) Rate =  $k[A]^2[B]$   
B) rate =  $k[A][B]$   
C) Rate =  $k[C]$   
D) None

For the reaction  $2A + B \rightarrow C + D$   
The expression for the rate law is, Rate =  $k[A]^2$   
The order of reaction in B is  
A) First  
B) Second  
C) Third  
D) None of these

The activation energy for a reaction can be  
A) Increased by increasing temperature  
B) Increased by decreasing temperature  
C) Decreased by increasing concentration of reactants  
D) None of these

Rate law for the reaction

None of these

Rate law for the reaction

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19. Which one of the following oxides react with aqueous  $\text{NaOH}$  to give a salt?  
A) Calcium oxide  
B) Iron oxide  
C) Zinc oxide  
D) Magnesium oxide

20. Which one of the following salts cannot be prepared by a reaction between a dilute acid and a metal?  
A)  $\text{CaCl}_2$   
B)  $\text{CuCl}_2$   
C)  $\text{FeCl}_2$   
D)  $\text{ZnSO}_4$

Which one of the following salts cannot be prepared by a reaction between a dilute acid and a metal?  
A)  $\text{CaCl}_2$   
B)  $\text{CuCl}_2$   
C)  $\text{FeCl}_2$   
D)  $\text{ZnSO}_4$

$R-X + H_2O \rightarrow R-OH + HX$  In, rate =  $[R-X]$   
The rate of reaction will be doubled when  
A) Concentration of  $H_2O$  is doubled  
B) Concentration of  $R-X$  is reduced to half  
C) Concentration of both  $R-X$  and  $H_2O$  is doubled  
D) None of these

7. The rate of a catalyzed reaction is independent of the concentration of  
A) Reactants  
B) Products  
C) Catalyst  
D) None of these

8. If a reaction proceeds in such a way that order of reaction is independent of the reactants concentration, the overall order of reaction would be  
A) First  
B) Second  
C) Third  
D) Zero

9. Reactions with high activation energy are usually  
A) Fast  
B) Slow  
C) Exothermic  
D) Reversible

10. In a reversible reaction catalyst lowers the activation energy of the  
A) Forward reaction  
B) Reverse reaction  
C) Forward as well as reverse reaction  
D) Forward reaction but increases for the reverse reaction

Answer key of chapter 9:

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## Chapter 10 - Solutions and Colloids

- 18g glucose is dissolved in 180g of water. The relative lowering of vapour pressure is  
A) 1  
B) 18  
C) 0.01  
D) 0.001
- 100g of a 10% (W/W) NaOH contains 10g of NaOH in  
A) 100g of  $H_2O$   
B) 10g of  $H_2O$   
C) 110g of  $H_2O$   
D) 100g of solution
- Which of the following W/W solutions has the lowest freezing point?  
A) 18% glucose  
B) 34.2% sucrose  
C) 6% urea  
D) 9% glucose
- All solutions containing 1 g of non-volatile solutes will have  
A) Same vapour pressure  
B) Same boiling point  
C) Same freezing point  
D) All of A B C
- Molarity of pure water is  
A) 1  
B) 18  
C) 55.5  
D) 18
- A solution of urea (Mol. Wt = 60) is 10% (W/V). the volume in which 1 mole of it is dissolved will be  
A) 6 dm<sup>3</sup>  
B) 0.5 dm<sup>3</sup>  
C) 60 cm<sup>3</sup>  
D) 0.54 dm<sup>3</sup>
- The solubility of a substance decreases with increase in temperature. It heat of solution is  
A) positive  
B) negative  
C) zero  
D) cannot be predicted
- Molarity of glucose solution when 9g of it is dissolved in 250 cm<sup>3</sup> of solution is  
A) 0.25M  
B) 0.2m  
C) 0.5M  
D) None of these
- Sea water has about 6 ppm dissolved oxygen. What mass of dissolved oxygen is present in one kg of sea water  
A) 6g  
B)  $6 \times 10^{-1}$  kg  
C)  $6 \times 10^{-3}$  g  
D)  $6 \times 10^{-3}$  mg
- Which of the following is volatile?  
A) glucose  
B) urea  
C) sucrose  
D) water
- Which of the following is not true of a colloid?  
A) it is heterogeneous  
B) scatter light  
C) can pass through ultra-filter paper  
D) its particles cannot be seen under ordinary microscope
- Aerosol are colloids which contain  
A) A solid dispersed in a liquid  
B) A solid dispersed in a gas  
C) A liquid dispersed in a gas  
D) A liquid in another liquid

### Answer Key of Chapter 10:

1. C | 2. D | 3. D | 4. D | 5. C | 6. B | 7. B | 8. D | 9. C | 10. D | 11. C | 12. C

## Chapter 11 - Thermochemistry

Choose the correct answer

Which of the following substances have zero value for their standard enthalpy of formation?

1. A)  $O_2$   
B)  $H_2O$   
C)  $ZnO$   
D) None of these.

Caloric is equivalent to

2. A) 4.18J  
B) 4.18KJ  
C) 0.418J  
D) 0.418KJ

Enthalpy of neutralization of all the strong acids and strong bases has the same value due to

3. A) the formation of salt and water

B) the formation of salt

C) the complete ionization of acids and bases

D) the combination of  $H^+$  and  $OH^-$  ions to form water

4. Total heat content of a system is called

1. A) Formation  
B) Internal energy  
C) heat  
D) state function

5. Heat of \_\_\_\_\_ of a substance is always negative

1. A) Formation  
B) combustion  
C) decomposition  
D) solution



1. A balloon filled with oxygen is placed in a freezer. Identify system
- A) balloon B) oxygen C) freezer D) all of these
2. A bomb calorimeter is used in calorimeter
- A) constant volume B) constant pressure C) both A and B D) constant temperature
3. A bomb calorimeter is used to determine lattice energies of
- A) Molecular solids B) ionic solids C) Covalent solids D) metallic solids
4.  $q = \Delta H$  when
- A)  $\Delta V = 0$  B)  $P = 0$  C)  $\Delta E = 0$  D) none of these
5. Enthalpy of combustion for C is -393.5
- C(s) + O<sub>2</sub>(g) → CO<sub>2</sub>(g)

Answer Key of Chapter 11.

1. D | 2. A | 3. C | 4. A | 5. B | 6. B | 7. A | 8. B | 9. B | 10. B | 11. D | 12. C

Chapter 12 - Electrochemistry

Choose the correct answer

1. The electrode through which the electron enters the electrolytic solution is
- A) Anode B) Cathode C) Salt Bridge D) Electrolyte

2. Oxidation number of S in Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> is
- A) 1 B) 2 C) 3 D) 4

3. In the electrolysis of molten ZnCl<sub>2</sub> the cathode reaction is  $Zn^{2+} + 2e^- \rightarrow Zn$  what quantity of electricity is used for the production of half mole of Zn
- A) 2 (coulombs) B) 1F C) 2F D) 2 ampere

4. How many moles of Cr will be produced by 1.5 faradays of electricity by the following reaction
- $Cr^{3+} + 3e^- \rightarrow Cr$
- A) 0.1 B) 0.2 C) 0.03 D) 1.5

5.  $E^\circ_{Fe} = 0.14V$ ,  $E^\circ_{Pb} = -0.13V$
- A) Sn can oxidize B) Pb<sup>2+</sup> can oxidize Sn C) both can oxidize each other D) both can reduce each other

6. A fuel cell operates at \_\_\_\_\_ temperature
- A) low B) medium C) room D) high

7. The oxidation number of Cr in HCrO<sub>4</sub> is
- A) 6 B) 7 C) 8 D) 9

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$\Delta H^\circ_{\text{combustion}} = -393 \text{ KJ/mole}^{-1}$   
Enthalpy of formation of CO<sub>2</sub> would be

- A) +393 KJ B) -393 KJ C) Zero D) Cannot be predicted from the given equation

11. Which of the following is not a state function of a system?
- A) Thermal energy at constant pressure B) enthalpy C) work done D) internal energy

12. For writing a thermochemical equation for
- A) 1 mole of element as reactant B) 1 mole of oxide of element as product C) Standard states of all the substances D) Balanced equation of 1 mole of element

8. In which of the following compounds oxidation number of N is +5
- A) NO<sub>2</sub> B) N<sub>2</sub>O<sub>4</sub> C) N<sub>2</sub>O D) N<sub>2</sub>O<sub>5</sub>

9. The passage of current through an electrolyte is due to the movement of
- A) electrons B) anions C) cations D) ions

10. Oxidation number of an element in free state is
- A) Negative B) positive C) Zero D) ±1

11. Which of these is not true of an electrolyte.
- A) It can conduct electricity in molten state B) It can conduct electricity in the form of aqueous solution. C) It can conduct electricity in the solid form D) It can be an acid, a base or a salt

12. In an electrolytic cell, the name of electrode which has more negative potential begins with the letter
- A) A to B B) C to D C) K to L D) U to V

13. Corrosion is an electrochemical process which requires
- A) Oxygen B) Water C) Acetic vapours D) Basic vapours

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1. A	2. A B	C) KOH	D) PI
3. A, b, C	4. A, b, c, d	1 A	2. A, B
14. A fuel cell is based upon the reaction between	B) Gaseous fuel	3 A, B, C	4 A B C D
A) Oxygen			

Answer Key of Chapter 12:

1. B	3. B	5. B	7. B	9. D	11. C	13. B
2. B	4. E	6. D	8. D	10. C	12. B	14. ?

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Chapter 13 - s and p Block Elements

oxides and hydroxides of Group I elements are:

- a) Acidic  
b) Alkaline  
c) Neutral  
d) Amphoteric

The flame colour of sodium metal or its compounds is:

- a) Bright crimson  
b) Violet  
c) Golden yellow  
d) Bright blue

When sodium burns in air, it forms sodium:

- a) Monoxide  
b) Peroxide  
c) Oxide  
d) Superoxide

The carbonates of alkali metal are not affected by heat except

- a)  $Li_2CO_3$   
b)  $Na_2CO_3$   
c)  $K_2CO_3$   
d)  $Rb_2CO_3$

Green is characteristic flame colour of:

- a) Calcium  
b) Barium  
c) Strontium  
d) Sodium

All the carbonates sulphates and phosphates of alkaline earth metals are in water.

- a) Sparingly  
b) Soluble  
c) Insoluble  
d) Less soluble

The first ionization energy is higher for the:

- a) Alkaline earth metals  
b) Alkali metals  
c) Halogens  
d) Noble gases

Which one of the element has the maximum electron affinity?

- a) F  
b) Cl  
c) Br  
d) I

Which pair has both members from same period of periodic table?

- a) Na - Ca  
b) Na - Cl  
c) Ca - Cl  
d) Cl - Br

Melting points and boiling points of alkali metals

- a) Decreases from top to bottom  
b) Increases from top to bottom

c) First increases then decreases

d) Remains unchanged

11. Which of the following oxides is amphoteric in nature?

- a) Rubidium oxide  
b) Barium oxide  
c) Antimony  
d) Sulphur oxide

12. Oxidizing power of halogen depends upon:

- a) Heat of dissociation  
b) Electron affinity  
c) Heat of vaporization  
d) All of these

13. Which of following oxides amphoteric in nature?

- a)  $MgO$   
b)  $BeO$   
c)  $CO_2$   
d)  $SnO_2$

14. Select the correct increasing order of atomic radius?

- a)  $Ne > O > S > Al$   
b)  $Ne < O > S > Al$   
c)  $Ne < O > S > Al$   
d)  $Ne > O < S < Al$

15. Due to inert pair effect more stable than \_\_\_ for Sn and Pb.

- a)  $2s, 4p$   
b)  $1s, 4p$   
c)  $4s, 2p$   
d)  $2s, 3p$

16. Highest electron affinity is shown by?

- a)  $F_2$   
b)  $I_2$   
c)  $Br_2$   
d)  $Cl_2$

17. Which is the strongest reducing agent?

- a)  $H_2$   
b)  $HCl$   
c)  $Br_2$   
d)  $HBr$

18. Substance boiling at higher temperature among following is?

- a)  $HCl$   
b)  $HBr$   
c)  $HCl$   
d)  $HBr$

19. Group VII-A elements are generally called:

- a) Halogens  
b) Noble gases  
c) Inert gases  
d) Metalloids

20. The radioactive element in halogen group is:

- a) Radon  
b) Radium  
c) Astatine  
d) Bromine

Chapter 14 - d and f Block Elements

1. Coinage metals are actually

- a) Halogens  
b) Alkali metals  
c) Transition metals  
d) Alkaline earth metals

2. Zinc is a transition element but it does not show variable valency because:

- a) It does not form colored salts  
b) It has incomplete filled d subshell  
c) It has completely filled d subshell  
d) It has two electrons in outer most orbit

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element? The following is non-typical transition element?

4. Which element form alloy?  
A) Fe  
B) Mn  
C) Zn  
D) Cr
5. Which are repelled by magnetic field?  
A) Paramagnetic  
B) Ferromagnetic  
C) Diamagnetic  
D) None
6. Magnetic moment (u) of an atom or ion is the measure of its number of unpaired  
A) Electron  
B) Proton  
C) Neutron  
D) Neutrons
7. The unit of magnetic moment is  
A) Coulombs (C)  
B) Amperes (A)  
C) Bohr magneton (BM)  
D) Watts (W)
8. Bronze alloy contains:  
A) Cu and Sn  
B) Ni and C  
C) Cu and Zn  
D) Cr and Fe
9. Give the systematic name for  $\text{Fe}(\text{CO})_5$   
A) Pentacarbonyl iron (III)  
B) Pentacarbonyl iron (II)  
C) Pentacarbonyl iron (I)  
D) Pentacarbonyl ferrate (II)
10. Give the chemical formula of a complex compound sodium tetrachloropentacyanoferrate (IN).  
A)  $[\text{NaFeCl}(\text{CN})_4]$   
B)  $[\text{Fe}(\text{Na})_4]$   
C)  $[\text{NaFeCl}(\text{CN})_4]$   
D)  $[\text{Na}_4\text{Fe}]$
11. The complexes having coordination number (CN) = 4 have geometry:  
A) tetrahedral  
B) linear  
C) Square planar  
D) both A and C

Answer key of Chapter 14:

1. C	3. C	5. C	7. C	9. B	11. A	13. C	15. A	17. C	19. C
2. C	4. D	6. A	8. A	10. A	12. A	14. B	16. A	18. C	20. A

### Chapter 15 - Organic Compounds

Select the right answer from the choices given with each question.

1. The major portion of natural gas is:  
A) Methane  
B) propane  
C) Butane  
D) Methane
2. In organic compounds carbon atoms form:  
A) Ionic bond  
B) Metallic bond  
C) Covalent bond  
D) None of these
3. Which of the following is an aromatic compound?  
A) Propanol  
B) Cyclohexane  
C) Benzene  
D) Benzene
4. There are few homologous series of compounds. The existence of homologous series is due to:  
A) functional group  
B) C-Chain  
C) Isomerism  
D) Polymerization
5. Which of the following compound is heterocyclic alcohol?  
A) Pyridine  
B) Pyrole  
C) Thiophene  
D) All of the above
6. Select from the following the one, which is alcohol:  
A)  $\text{C}_2\text{H}_5\text{-Cl}$   
B)  $\text{CH}_3\text{-O-CH}_3$   
C)  $\text{C}_2\text{H}_5\text{-OH}$   
D)  $\text{C}_2\text{H}_5\text{-Cl}$

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1. Lassaigne's solution is prepared in the detection of elements of organic compound. Which metal is used for the reaction with organic compound?  
 A) Aluminum  
 B) sodium  
 C) Iron  
 D) Copper

2. When  $\text{AgNO}_3$  is added to the Lassaigne's solution which colour is formed for Iodide?  
 A) blue  
 B) violet  
 C) Green  
 D) Deep yellow

Answer Key of Chapter 14:

1. A	3. D	5. D	7. B	9. B	11. B
2. C	4. A	6. A	8. D	10. C	

Chapter 16 - Hydrocarbons

Select the right answer from the choices given with each question.

- The molecule of ethane possesses which hybridization.  
 A)  $\text{sp}$   
 B)  $\text{sp}^2$   
 C)  $\text{sp}^3$   
 D)  $\text{sp}^4$
- The  $\text{sp}^3$  hybrid orbitals are oriented in space at one angle.  
 A)  $180^\circ$   
 B)  $120^\circ$   
 C)  $109.5^\circ$   
 D)  $90^\circ$
- The geometry of acetylene is.  
 A) Angular  
 B) bent  
 C) linear  
 D) tetrahedral
- Which reaction is used as test for the presence of alkane:  
 A) Reaction of cold diluted alkaline  $\text{KMnO}_4$   
 B) Combustion  
 C) Polymerization  
 D) catalytic hydrogenation
- The general formula of alkane is  
 A)  $\text{C}_n\text{H}_{n+2}$   
 B)  $\text{C}_n\text{H}_{n+4}$   
 C)  $\text{C}_n\text{H}_{n+6}$   
 D)  $\text{C}_n\text{H}_{n+8}$
- Soda lime is:  
 A)  $\text{NaOH}$   
 B)  $\text{KOH}$   
 C) Mixture of  $\text{NaOH}$  &  $\text{CaO}$  hydroxide  
 D)  $\text{CaO}$  and  $\text{NaOH}$
- The marsh gas is:  
 A) Ethane  
 B) Methane  
 C) Propane  
 D) Butane
- Acidic hydrogen is present:  
 A) Ethane  
 B) Methane  
 C) Propane  
 D) Butane

- When water vapours are passed over, white fumes are formed?  
 A) white  
 B) yellow  
 C) deep blue  
 D) brown
- The simplest molecule of Mucky Ball contains carbon atoms.  
 A) 20  
 B) 40  
 C) 60  
 D) 80
- If a molecule contains more than one functional group, it is known as.  
 A) Derivative  
 B) Poly functional  
 C) Hetero cycle  
 D) Isomer

- Acetylene  
 A) Benzene  
 B) Ethane  
 C) Ethene  
 D) Ethyne
- The benzene molecule contains:  
 A) three double bonds  
 B) two double bonds  
 C) one double bond  
 D) delocalized
- The electrophile in aromatic Sulphonation is:  
 A)  $\text{H}_2\text{SO}_4$   
 B)  $\text{HSO}_4^-$   
 C)  $\text{SO}_3$   
 D)  $\text{SO}_4^{2-}$
- The conversion of n-hexane into benzene by heating in the presence of  $\text{Pt}$  is called:  
 A) Isomerization  
 B) Aromatization  
 C) decalkylation  
 D) Rearrangement
- Catalyst used for Friedel-Crafts reaction is:  
 A)  $\text{HNO}_3$   
 B)  $\text{AlCl}_3$   
 C)  $\text{BaCl}_2$   
 D)  $\text{NaCl}$
- Benzene cannot undergo:  
 A) Elimination  
 B) Substitution  
 C) Oxidation  
 D) Addition
- Shape of benzene molecule is.  
 A) pyramidal  
 B) linear planar  
 C) trigonal  
 D) hexagonal planar
- In which one of the following compounds the benzene ring is isolated:  
 A) Naphthalene  
 B) Anthracene  
 C) Phenanthrene  
 D) Diphenyl methane
- Two compounds have the same composition and also have the same atoms attached to some atoms, although with different orientations in space, these compounds are:  
 A) identical  
 B) position isomer  
 C) functional isomer  
 D) chain isomer

17. **Isomers of a substance must have:**  
 A) same chemical properties  
 B) some molecular weight  
 C) same structural formula  
 D) some functional groups
18. **Ethanol and dimethyl ether are best considered**  
 A) structural isomers  
 B) enantiomers  
 C) stereoisomers  
 D) diastereomers
19. **Alkanes show geo-metrical isomers due to:**  
 A) Asymmetry  
 B) Rotation around a single bond  
 C) Resonance  
 D) Restricted rotation around a double bond
20. **A molecule is said to be chiral:**  
 A) It contains plane of symmetry  
 B) It contains center of symmetry  
 C) It cannot be superimposed to its mirror image  
 D) It can be superimposed on its mirror image
21. **Geometrical isomerism is shown by:**  
 A) lactic acid  
 B) maleic acid

Answer Key of Chapter 16:

1. A	3. D	5. A	7. B	9. A	11. B	13. A	15. D	17. B	19. B
2. A	4. A	6. D	8. A	10. C	12. B	14. D	16. D	18. A	20. C

### Chapter 17 - Alkyl Halides and Amines

Select the right answer from the choices given with each question.

1. **In primary alkyl halides, the halogen atom is attached to a carbon which is further attached to how many carbon atoms:**  
 A) Two  
 B) Three  
 C) One  
 D) Four
2.  **$S_N2$  reactions can be best carried out with:**  
 A) Primary alkyl halides  
 B) Secondary alkyl halides  
 C) Tertiary alkyl halides  
 D) All the three
3. **For which mechanisms the first step in valence is the same:**  
 A)  $E1$  and  $E2$   
 B)  $E1$  and  $S_N2$   
 C)  $E1$  and  $S_N1$   
 D)  $E2$  and  $S_N2$
4. **The rate of  $E1$  reaction depends upon:**  
 A) the concentration of nucleophile  
 B) the concentration of substrate as well as  
 C) the concentration of substrate  
 D) none of the above
5. **Alkyl halides are considered to be very reactive compounds towards nucleophilic because:**

22. **Which of the following statements regarding compound?**  
 A) rotate the plane of polarized light  
 B) have cis and trans isomers  
 C) exist as enantiomers  
 D) can be detected with a polarimeter
23. **An optically active compound:**  
 A) must contain at least four carbon  
 B) when in solution rotates the plane of polarized light  
 C) must always contains on asymmetric carbon  
 D) in solution always give a negative reading in polarimetry
24. **Plane polarized light is affected by:**  
 A) identical molecules  
 B) all polymers  
 C) chiral molecule  
 D) all biomolecules
25. **It is possible to distinguish between optical isomers.**  
 A) by using chemical tests  
 B) by mass spectrometry  
 C) by IR spectroscopy  
 D) by polarimetry

6. **Which one of the following is not a nucleophile?**  
 A)  $H_2O$   
 B)  $HS^-$   
 C)  $BF_3$   
 D)  $NH_3$
7. **Double bond is formed as a result of:**  
 A) Substitution reactions  
 B) Elimination reactions  
 C) Addition reactions  
 D) Rearrangement reactions
8. **Which of the following alkyl halides cannot be formed by direct reaction of alkanes with halogens?**  
 A) R-Br  
 B) R-Cl  
 C) R-F  
 D) R-I
9.  **$CH_3CH_2Br$  on treatment with alc. KOH gives**  
 A) Propanol  
 B) Propene  
 C) Propane  
 D) None
10. **Grignard's reagent gives alkane with:**  
 A) water  
 B) Ethylamine  
 C) Ethanol  
 D) All of these

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1. Action of alkyl halides with Na metal field:  
 a) Alkanes  
 b) Alcohols  
 c) Alkenes  
 d) Phenols
2. Alkyl halides react with excess of ammonia to give:  
 a) 1° amine  
 b) 2° amine  
 c) 3° amine  
 d) all
3. Among the alkyl halides the primary alkyl halides always follow the mechanism.  
 a) SN1  
 b) SN2

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14. Grignard's reagent on treatment with chloroform gives:  
 a) Acetone  
 b) Primary amine  
 c) Secondary amine  
 d) Tertiary amine
15. Nucleophilic addition of a primary amine gives:  
 a) Amine  
 b) Tertiary amine  
 c) Secondary amine  
 d) Nitrile

Answer Key of Chapter 17,

3. D	5. B	7. B	9. B	11. A	13. B	15. A
4. A	6. C	8. D	10. D	12. C	14. B	

Chapter 18 - Alcohol, Phenol and Ether

Select the right answer from the choices given with each question.

1. Which compound shows hydrogen bonding?  
 a)  $C_2H_6$   
 b)  $C_2H_5Cl$   
 c)  $CH_3 - O - CH_3$   
 d)  $C_2H_5OH$
2. Which compound is called a universal solvent?  
 a)  $H_2O$   
 b)  $CH_3OH$   
 c)  $C_2H_5OH$   
 d)  $CH_3COOH$
3. According to Lewis concept ethers behave as:  
 a) Acid  
 b) Base  
 c) Acid as well as base  
 d) None of them
4. Ethanol can be converted into ethanoic acid by:  
 a) Hydrogenation  
 b) Hydration  
 c) Oxidation  
 d) Fermentation
5. Ethanol is denatured by adding:  
 a) methanol  
 b)  $C_2H_5OH$   
 c) acetic acid  
 d) Propanol
6. Acetone  
 a) Ethane  
 b) Alcohol  
 c) Ether  
 d) Ester
7. Williamson synthesis of ethers is superior to alcohols because it makes:  
 a) Symmetrical ethers  
 b) Asymmetrical ethers  
 c) Ether at room temperature  
 d) Both symmetrical and asymmetrical ethers
8. Both symmetrical and asymmetrical ethers:  
 a) methyl phenol is also called:  
 b) Benzyl alcohol  
 c) A Cresol  
 d) Formaldehyde

Answer Key of Chapter 18

3. B	5. A	7. C	9. D	11. A	13. D	15. A
4. D	6. D	8. A	10. D	12. C	14. C	

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- Select the right answer from the choices given with each question.
- The carbon atom of carbon atom of a carbonyl group is.
    - sp hybridized
    - sp<sup>2</sup> hybridized
    - sp<sup>3</sup> hybridized
    - sp<sup>4</sup> hybridized
  - Ketones are prepared by the oxidation of:
    - Primary alcohol
    - Tertiary alcohol
    - Secondary alcohol
    - None of these
  - Acetone reacts with HCN to form a Cyanohydrin. It is an example of:
    - electrophilic addition
    - electrophilic substitution
    - nucleophilic addition
    - nucleophilic substitution
  - annizzaro's reaction is not given by:
    - formaldehyde benzaldehyde
    - acetaldehyde
    - benzaldehyde
    - dimethyl acetaldehyde
  - Which of the following reagents will react with both aldehydes and ketones?
    - Grignard reagent
    - Tollens reagent
    - Fehling's reagent
    - Dinitrophenyl reagent
  - Aldehydes are the oxidation product of
    - p - alcohols
    - secondary alcohols
    - tertiary alcohols
    - Which of the following compounds will not give iodoform test on treatment with I<sub>2</sub>/NaOH?
  - Aldehydes and ketones are carbonyl compounds. Which of them react both with NaBH<sub>4</sub> and with Tollens reagent?
    - Acetaldehyde
    - Acetone
    - Butanone
    - pentanone

Answer Key of Chapter 19:

1. B	3. C	5. A	7. D	9. B	11. B	13. A	15. C
2. B	4. B	6. A	8. B	10. A	12. D	14. B	

Chapter 20 - Carboxylic Acid and Functional Derivatives

- Select the right answer from the choices given with each question.
- each question.
1. A carboxylic acid contains functional group:
  - A Hydroxyl group
  - A Carbonyl group
  - A Hydroxyl and Carbonyl group
  - A Carbonyl and aldehyde group
2. From the following carboxylic acids which acid has higher acidity:
  - Ethanoic acid
  - Propanoic acid
  - Chloro ethanoic acid
  - Nitro ethanoic acid
3. Which reagent is used to reduce carboxylic acid?
  - LiAlH<sub>4</sub>
  - H<sub>2</sub>/Pt
  - NaBH<sub>4</sub>
  - LiAlH<sub>4</sub>

- stronger acid
- CH<sub>3</sub>COOH
  - CH<sub>3</sub>CH<sub>2</sub>COOH
  - CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>COOH
  - CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>COOH
5. Heating
  - Acetic acid
  - Formic acid
  - Benzoic acid
  - Phenylacetic acid
6. The hybridization of the carbonyl carbon in carboxylic acid is:
  - sp
  - sp<sup>2</sup>
  - sp<sup>3</sup>
  - sp<sup>4</sup>
7. Ethane-1,2-diol
  - Benzoic acid
  - Formic acid
  - Acetic acid
  - Phenylacetic acid
8. Grignard reagent
  - CH<sub>3</sub>COOH
  - CH<sub>3</sub>CH<sub>2</sub>COOH
  - CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>COOH
  - CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>COOH
9. The hybridization of the carbonyl carbon in carboxylic acid is:
  - sp
  - sp<sup>2</sup>
  - sp<sup>3</sup>
  - sp<sup>4</sup>



stronger acid is:  
A)  $\text{CH}_3\text{COOH}$   
B)  $\text{HClO}_4$   
C)  $\text{CH}_3\text{CH}_2\text{COOH}$   
D)  $\text{ClCH}_2\text{CH}_2\text{COOH}$

Acetamide is prepared by:

A) Heating ammonium acetate

B) Heating methyl cyanide

C) Heating ethyl acetate

D) The hydrolysis of methyl cyanide

Carboxylic acids react with metal to form salts with the evolution of:

A)  $\text{CO}_2$

C)  $\text{CO}$

Ethane-1, 2 dioic acid is also called:

A) Benzoic acid

C) formic acid

Carboxylic acid can be prepared by the action of Grignard's reagent with:

A)  $\text{O}_2$

C)  $\text{KCl}$

The 11 PAC names for formic acid is:

A) Methanoic acid

B) Acetic acid

1. Biochemistry covers the practical application of:

A) Medicine

C) Nutrition

2. Macromolecules are of how many types?

A) Three

C) Five

3. The general formula for carbohydrates is:

A)  $\text{N}_x\text{H}_y\text{O}_z$

C)  $\text{C}_x\text{H}_y\text{O}_z$

4. Most organic matter on earth is made up of:

A) Carbohydrates

C) Oils

5. The no. of carbon atoms in hexose is:

A) One

C) Olive Oils

6. The long chains of Amino Acids are called:

A) Oils

C) Polypeptide

10. The reaction of alcohol with acetic acid is known as:

A) Saponification

C) ammonolysis

11. Esters are formed by the reaction of carboxylic acids with:

A) Alcohols

C) aldehydes

12. Which one of the following has both hydroxyl and carboxylic acid groups:

A) phenol

C) phthalic acid

13. Which of the following cannot be prepared directly from acetic acid?

A) acetyl chloride

C) acetic anhydride

14. Reaction between caustic soda and a fat is called:

A) Esterification

C) Neutralization

15. When a carboxylic acid reacts with alcohol, it produces a new class of compounds:

A) ethers

C) anhydride

Answer Key of Chapter 20:

1. B	3. D	5. A	7. B	9. A	11. A	13. A	15. B
2. C	4. B	6. B	8. B	10. B	12. D	14. D	

Chapter 21 - Biochemistry

Select the right answer from the choices given with each question.

1. Biochemistry covers the practical application of:

A) Medicine

C) Nutrition

2. Macromolecules are of how many types?

A) Three

C) Five

3. The general formula for carbohydrates is:

A)  $\text{N}_x\text{H}_y\text{O}_z$

C)  $\text{C}_x\text{H}_y\text{O}_z$

4. Most organic matter on earth is made up of:

A) Carbohydrates

C) Oils

5. The no. of carbon atoms in hexose is:

A) One

C) Olive Oils

6. The long chains of Amino Acids are called:

A) Oils

C) Polypeptide

C) Proteins

7. Proteins are used in both forms of:

A) Catabolism

C) Enzymes

8. What is TRUE about enzymes?

A) They make biochemical reaction to proceed spontaneously

B) They lower the activation energy of a reaction.

C) They are not very specific in their choice of substrates.

D) They are needed in large quantities.

9. To what category of molecules do enzymes belong?

A) Carbohydrates

C) Nucleic acids

10. What is TRUE about cofactors?

A) Break hydrogen bonds in proteins

B) Help facilitate enzyme activity.

C) Increase activation energy

D) Are composed of proteins

- the groups are:
- Required by all enzyme
  - Loosely attached with enzyme
  - Proteins attached with enzyme
  - Tightly bound to enzyme

12. Lipids are generally defined in terms of:

- Solubility
- Molarity
- Structure
- None of these

13. DNA and RNA are made up of:

- Peptides
- Nucleotides
- Nucleic acids
- None of these

14. \_\_\_\_\_ of the human body weight is mineral matter?

- 5%
- 10%
- 50%
- 100%

15. \_\_\_\_\_ is needed for vitamin C

- Acid
  - Iron
  - Phosphorus
  - Sulphur
16. The component of blood that carries oxygen is:
- Fats
  - Myoglobin
  - Hemoglobin
  - Antibody Acid
17. Most RNA molecules are:
- Independent
  - Double Stranded
  - Single Stranded
  - Multiple Stranded
18. \_\_\_\_\_ are the major component of soap:
- Fatty Acids
  - Palm Oil
  - Proteins
  - Saccharides
19. The mineral, related with the formation of bones and teeth is:
- RNA
  - Phosphorus
  - Iron
  - Sulphur

### Answer Key of Chapter 21:

1. D	3. C	5. C	7. D	9. D	11. D	13. B	15. ..	17. C	19. B
2. B	4. D	6. C	8. B	10. B	12. B	14. A	16. C	18. B	

### Chapter 22 - Industrial Chemistry

Select the right answer from the choices given with each question.

1. The branch of chemistry which applies physical and chemical procedures towards the transformation of natural raw material and their derivatives to products is called:

- Physical chemistry
- Classical chemistry
- Industrial chemistry
- both B and C

2. Which dye is used in boot polish:

- Azo dye
- Congo red
- Methyl orange
- Bismarck Brown

3. Miticides are used to control:

- Insects and mites
- Insect and bees
- Unwanted plants
- A and C

4. Aerosols and lotions are used as:

- Fungicides
- Pesticides
- Herbicides
- A and C

5. Petrochemicals are classified into how many classes?

- One
- Two
- Three
- Four

6. How many classes of polymers?

- One
- Two
- Three
- Four

7. Nylon is a polymer obtained by:

- One
- Two
- Three
- Four

A) Addition polymerization  
B) Condensation polymerization  
C) Homopolymer  
D) None

8. Which of following is not a raw material for nail polish?

- Peel
- Castor oil
- Resorcinol
- Nitrocellulose

9. A polymer which becomes hard on heating is:

- Thermosetting
- Thermoplastic
- Addition
- None

10. Nail Polish remover base commonly contains a mixture of two organic solvents as:

- Benzene and acetone
- ethyl acetate and C<sub>2</sub>H<sub>5</sub>OH
- Benzene and C<sub>2</sub>H<sub>5</sub>OH
- acetone and ethyl acetate

11. Which of following adhesives are also known as bio adhesives?

- Drying adhesives
- Synthetic adhesives
- Natural adhesives
- Hot glue

12. A chemical compound which is meant to stick things together:

- Nail polish
- Lipstick
- Hair dye
- Adhesives

13. In early ages hair dyes were made from:

- Plants
- Animals

Ali Series  
Metallic compounds with polymers with kind of mixture

Select the correct with each c  
Air is polluted  
A) Toxic  
C) Harmful  
Which of T  
A) SO<sub>2</sub>  
C) CO<sub>2</sub>  
Oxides of  
from:  
A) Bases  
C) Salts  
Oxidizing  
A) SO<sub>2</sub>  
C) NO<sub>2</sub>  
Thickener  
A) 20-22  
C) 30-32  
Ozone is  
A) SO<sub>2</sub>  
C) H<sub>2</sub>O  
In leather

Select with each c  
Which  
A) 20-22  
C) 30-32  
Ozone is  
A) SO<sub>2</sub>  
C) H<sub>2</sub>O  
In leather

1. Metallic compounds  
2. Polymers which are prepared from more than one kind of monomer are:

- 1) Both A and C  
2) Polymers which are prepared from more than one kind of monomer are:

MCQs and National MCQs by All Sudais

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

Answer Key of Chapter 22

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

Chapter 23 - Environmental Chemistry

Select the right answer from the choices given

1. Air is polluted by:  
2. Acid rain is caused by:  
3. Which of the following gases is not pollutant?  
4. Ozone of sulfur and nitrogen react with oxygen to form:  
5. Acids:  
6. Salts:  
7. Oxidizing smog consists of high concentration of:  
8. A pollutant:  
9. Thickness of ozone is:  
10. Ozone is destroyed by:  
11. A pollutant:  
12. A pollutant:  
13. A pollutant:  
14. A pollutant:

- 1) Hydrocarbons  
2) All of above  
3) CO  
4) NO<sub>2</sub>  
5) Acids  
6) All of above  
7) SO<sub>2</sub>  
8) Ozone  
9) NO  
10) 25-28 Km  
11) 20-30 Km  
12) NO  
13) None of above  
14) Leather industry.

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

1. A  
2. B  
3. C  
4. D

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3. C  
4. D

1. A  
2. B  
3. C  
4. D

4. Which of the following is used as a source of visible radiations?  
A) Tungsten filament lamp B) Hydrogen discharge lamp C) Deuterium discharge lamp D) All of these
5. What is the wavelength range of the ordinary infrared region?  
A) 0.8 - 2.5  $\mu\text{m}$  B) 2.5 - 16  $\mu\text{m}$  C) 800 - 1000 nm D) 400 - 800 nm
6. The position of an infrared absorption band is commonly expressed by:  
A) Wavelength B) Wave number C) Both of these D) None of these
7. Which of the following is not used as a source of infrared radiations?  
A) Nernst filament B) Tungsten filament C) Globar D) None of these
8. Which region of the electromagnetic spectrum is involved in mass spectrometry?  
A) Visible B) Microwave C) Radiowave D) None of these
9. Mass spectrometry is an analytical technique which involves:  
A) Production of gaseous ions from the sample B) Separation of the gaseous ions C) Measurement of the relative abundance of the gaseous ions D) All of these
10. Mass spectrometry can be used to determine:  
A) Molecular weight B) Molecular formula C) molecular structure D) All of these
11. Which of the following species is detected in the mass spectrometer?  
A) Positively charged species B) Radical C) Neutral molecules D) All of these
12. Which of the following species is produced in the ionization chamber of a mass spectrometer?  
A) Positively charged species B) Radical C) Neutral molecules D) All of these
13. Which kind of information about a positively charged species obtained from a mass spectrometer?  
A) Molecular Weight B) Relative abundance C) Both of these D) None of these
14. What kind of sample can be studied in a mass spectrometer?  
A) A gas B) A liquid C) A solid D) All of these
15. Near ultraviolet region of the electromagnetic spectrum generally lies between:  
A) 10-200 nm B) 200-400 nm C) 400-750 nm D) 300-500 nm
16. Far ultraviolet or vacuum ultraviolet region generally lies between:  
A) 10-200 nm B) 200-400 nm C) 400-750 nm D) 300-500 nm
17. Far infrared region of the electromagnetic radiation generally lies between:  
A) 50-200 nm B) 103-400 nm C) 50-1000 nm D) 1-20 nm

Answer Key of Chapter 24:

- |      |      |      |      |       |       |       |       |       |
|------|------|------|------|-------|-------|-------|-------|-------|
| 1. C | 3. C | 5. C | 7. C | 9. C  | 11. A | 13. B | 15. A | 17. C |
| 2. C | 4. A | 6. B | 8. A | 10. A | 12. A | 14. A | 16. B |       |



Chapter 1: Measurements

Which of the following quantities has not been expressed in proper units?

A)  $\frac{\text{stress}}{\text{strain}}$  Newton meter<sup>2</sup>

B) Force - kg ms<sup>-1</sup>

C) Energy = kg ms<sup>-2</sup>

D) Pressure Newtonms<sup>-2</sup>

Which of the following correctly represent the S.I. unit of pressure?

A) Newton meter<sup>2</sup>

B) Newton<sup>2</sup> meter

C) Newton

D) Newton<sup>1</sup>

Which of the following may be used as a valid formula to calculate speed of ocean?  $v = \text{speed}$ ,  $g = \text{acceleration due to gravity}$ ,  $\lambda = \text{wave length}$ ,  $p = \text{density}$ ,  $h = \text{depth}$

A)  $\sqrt{ygh}$

B)  $\rho gh$

C)  $v = h\rho$

D) none

What is the SI unit of constant  $k$  in the following equation? Where  $F = 6\pi\eta rv$ , where  $F = \text{force}$ ,  $v = \text{velocity}$ ,  $r = \text{radius}$ .

A) Kg m<sup>1</sup>s<sup>-1</sup>

B) kg ms

C) kg<sup>1</sup> m<sup>2</sup>s

D) kg m<sup>2</sup>s<sup>2</sup>

Which of the following is a smallest value?

A) 1 mm x 1 pm

B) 1 cm x 1 km

C) 1 Gm x 1 Em

D) 1 am x 1 m

16m = ... ?

A) 10<sup>-4</sup>m

B) p

C) 10<sup>6</sup>

D) 10  $\mu$

In a cricket match, 500 spectators are counted one by one. How many significant figures will be there in the final result?

A) 3

B) 1

C) 2

D) 0

The equation relating pressure and density is  $p = \rho gh$ . How can both sides of this equation be written in terms of base units?

A) [Nm<sup>-1</sup>] = [kgm<sup>-3</sup>] [ms<sup>-1</sup>] [m]

B) [Nm<sup>-3</sup>] = [kgm<sup>-3</sup>] [ms<sup>-1</sup>] [m]

C) [kgm<sup>1</sup>s<sup>-3</sup>] = [kgm<sup>-3</sup>] [ms<sup>-2</sup>] [m]

D) [kgm<sup>1</sup>s<sup>-3</sup>] = [kgm<sup>-1</sup>] [ms<sup>-2</sup>] [m]

A series of measurements of the acceleration of free fall  $g$  is shown in the table which set of results is precise but not accurate?

Chapter 1 : Keys

11. C) 13. C) 15. C) 17. A)

12. D)

14. C)

16. B)

17. A)

	g/ms <sup>-2</sup>				
A)	9.81	9.79	9.84	9.83	9.79
B)	9.81	10.12	9.89	9.94	9.42
C)	9.45	9.21	8.99	8.76	8.51
D)	8.45	8.46	8.45	8.41	8.47

10. A mass  $m$  has acceleration  $a$ . It moves through a distance  $s$  in time  $t$ . The power used in accelerating the mass is equal to the product of force and velocity. The percentage uncertainties are 0.1% in  $m$ , 1% in  $a$ , 1.5% in  $s$ , 0.5% in  $t$ .

A) 2.1%

B) 2.6%

C) 3.1%

D) 4.1%

11. Which one is a pair of SI base units?

A) Ampere, joule

B) Coulomb, second

C) Kilogram, Kelvin

D) Meter, Newton

12. What is the ratio  $\frac{1\text{mm}}{1\text{cm}}$

A) 10<sup>1</sup>

B) 10<sup>2</sup>

C) 10<sup>-2</sup>

D) 10<sup>-1</sup>

13. A student measured the diameter of wire using a screw gauge with least count 0.001 cm. The correct measurement is

A) 5.3 cm

B) 5.32 cm

C) 5.320 cm

D) 5.3200 cm

14. The dimensions of frequency  $f$  are

A) [T<sup>-1</sup>]

B) [LT<sup>-1</sup>]

C) [Td]

D) [MT<sup>-1</sup>]

15. Which one is the least sub multiple?

A) pico

B) femto

C) Atto

D) none

16. One femto is equal to

A) 10<sup>15</sup> s

B) 10<sup>-15</sup> s

C) 10<sup>16</sup> s

D) 10<sup>-16</sup> s

17. The scientific notation of a number 0.0023 is expressed as

A) 2.3 x 10<sup>2</sup>

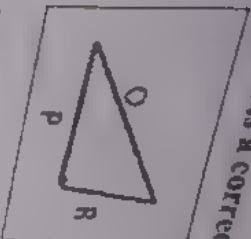
B) 0.023 x 10<sup>2</sup>

C) 2.3 x 10<sup>-4</sup>

D) 0.23 x 10<sup>1</sup>

## Chapter: 2: Vectors and Equilibrium

1. Which is a correct equation for vector R



- C)  $R = P + Q$       A)  $R = P - Q$       B)  $R = Q - P$   
D) None

2. Which of the following represents

Options	Vector	Scalar
A	Speed	Velocity
B	Acceleration	Deceleration
C	Force power	Power
D	Work	Density

3. For which angle the equation  $|A \cdot A| = \bar{A} \times \bar{B}$  is correct

- A)  $30^\circ$       B)  $45^\circ$   
C)  $60^\circ$       D)  $90^\circ$

4. The following diagrams show a uniform rod with its midpoint on a pivot. Two equal forces F are applied to the rod, as shown which diagram shows the rod in equilibrium?



5. Which of the following instrument works on the principle moments?

- A) Physical balance      B) Spring balance  
C) Measuring Cylinder      D) Vernier Calipers  
What is the net torque acting on the wheel of radius 2 m?



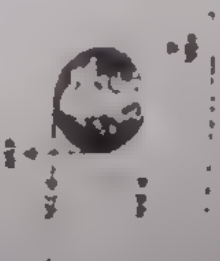
- A) 10 N anti-clockwise      B) 10 N m anti-clockwise

Chapter 2 : Keys

- C) 10 N m clockwise      D) 5 N m clockwise  
7. Find the mass of the rod as shown in figure below. centre of gravity is 14 cm from end A)



8. The diagram shows four forces applied to a circular object. Which of the following directions the resultant force and resultant torque on the object?



	Resultant Force	Resultant Torque
A)	Non Zero	Non Zero
B)	Non Zero	Zero
C)	Zero	Non Zero
D)	Zero	Zero

9. What is the angle between  $\bar{A}$  and  $\bar{B}$ , for which  $|\bar{B}| = |\bar{A} - \bar{B}|$ ?

- A)  $30^\circ$       B)  $30^\circ$   
C)  $60^\circ$       D)  $90^\circ$

10. The sum of two forces acting at a point is 16 N. If the resultant force is 8 N and its direction is perpendicular to minimum force then the forces are:

- A) 6 N and 10 N      B) 8 N and 8 N  
C) 4 N and 12 N      D) 2 N and 14 N

11. A person walks first 10 km north and 20 km east. then the resultant vector is

- A) 22.36 km      B) 22.46 km  
C) 25.23 km      D) 20.36 km

25. The horizontal component of earth magnetic flux density is  $1.8 \times 10^{-5} \text{ T}$ . The current in a horizontal wire is  $100 \text{ A}$ . Calculate the maximum force per unit length?
- A)  $1.8 \times 10^{-3} \text{ N/m}$   
B)  $2.88 \times 10^{-3} \text{ N/m}$   
C)  $2.88 \times 10^{-4} \text{ N/m}$   
D)  $2.88 \times 10^{-5} \text{ N/m}$
26. If we change the magnetic flux linking a coil by passing the coil in a constant magnetic field, the rate of change of this flux is
- A) Proportional to the area of the coil.  
B) Proportional to the resistance of the coil.  
C) Proportional to the magnetic field.  
D) Proportional to the length of the coil.
27. Electric field strength of a point charge is  $E$  and electric potential is  $V$  at a distance  $r$  from the point charge. What is the electric potential at a point for the same point charge where electric field strength is  $E/4$ ?
- A)  $4V$   
B)  $W/2$   
C)  $2V$   
D)  $2W$
28. In simple harmonic motion, acceleration will be maximum when object is at:
- A) Maximum displacement from the mean position.  
B) Minimum displacement from the mean position.  
C) Mean position.  
D) Minimum displacement from the mean position.
29. Calculate the energy of a proton of frequency  $3.0 \times 10^6 \text{ Hz}$ .
- A)  $6.63 \times 10^{-34} \text{ J}$   
B)  $1.99 \times 10^{-34} \text{ J}$   
C)  $1.99 \times 10^{-33} \text{ J}$   
D)  $1.989 \times 10^{-34} \text{ J}$
30. In relation  $\frac{1}{112} = 0.693$ , which quantity represented by  $\lambda$ ?
- A) Wavelength  
B) Wavelength  
C) Wavelength  
D) Decay constant
31. Path difference for the destructive interference can be written as:
- A)  $2n\lambda$   
B)  $\Delta s = (n+1)\lambda/2$   
C)  $2n\lambda/2$   
D)  $\Delta s = (2n+1)\lambda/2$
32. If a light is emitted by a single source pass through two narrow slits  $1.00 \text{ mm}$  apart. The interference pattern is observed on a screen  $200 \text{ cm}$  away and

the separation between the centers of adjacent bright fringes is  $2.00 \text{ mm}$ . What would be the wavelength of the light?

- A)  $1.00 \times 10^{-6} \text{ m}$   
B)  $1.00 \times 10^{-7} \text{ m}$   
C)  $1.00 \times 10^{-8} \text{ m}$   
D)  $1.00 \times 10^{-9} \text{ m}$
34. The sum of all forms of molecular energy (kinetic and potential) of a substance is
- A) Internal energy  
B) Heat energy  
C) Thermal energy  
D) Temperature
35. Calculate the rate at which energy is transferred by a  $220 \text{ V}$  main supply which produce a current of  $10 \text{ A}$  in a  $110 \Omega$ ?
- A)  $22 \text{ W}$   
B)  $22 \text{ W}$   
C)  $22 \text{ W}$   
D)  $22 \text{ W}$
36. A particle carrying a charge of  $5e$  fall through the potential difference of  $25 \text{ V}$ . What would be energy acquired by the particle in  $\text{J}$ ?
- A)  $2.5 \times 10^{-17} \text{ J}$   
B)  $2.5 \times 10^{-18} \text{ J}$   
C)  $2.5 \times 10^{-19} \text{ J}$   
D)  $2.5 \times 10^{-20} \text{ J}$
37. A copper wire has length  $l$  and cross sectional area  $A$ . Its resistance is  $R$ . If halved the length and halved the diameter of wire, then what will be resistance of the wire?
- A)  $R$   
B)  $3R$   
C)  $2R$   
D)  $4R$
38. Kirchhoff's first law rule corresponds to:
- A) Law of conservation of energy  
B) Law of conservation of charge  
C) Law of conservation of mass  
D) Law of conservation of momentum
39. Electric field strength at a point between two parallel charged plate is  $E$ . If the distance between plates is reproduce to half, what will be the new value of electric intensity?
- A)  $2E$   
B)  $E$   
C)  $E/2$   
D)  $E/4$
40. An object is moving along a circular path of radius  $4 \text{ m}$ . What will be its angular displacement when it moves  $14 \text{ m}$  on this circular path?
- A)  $0.5 \text{ rad}$   
B)  $0.5 \text{ rad}$   
C)  $0.5 \text{ rad}$   
D)  $0.5 \text{ rad}$

31. Gizzard  
Operculum is present in  
A) bony fish  
B) cartilaginous fish  
In which animal respiratory surface are found  
in more than one organ  
A) Birds  
B) Fish  
The heart is enclosed in a membrane called  
A) Pleura  
B) Peritoneum  
From right ventricle blood is pushed into  
A) pulmonary trunk  
B) aorta  
Which one is abundant in lymph  
A) Oxygen  
B) Water  
Jaws without teeth are found in  
A) Birds  
B) Fish  
Male reproductive part of flower is  
A) Stigma  
B) Carpel  
Coordination in plants is by  
(A) nervous system  
(B) hormones  
The simplest fatty acid is  
A) palmitic acid  
B) oleic acid  
All enzymes are protein which are  
A) Globular  
B) Helical  
Cilia are produced from  
(A) Mitochondria  
(B) Centriole  
Which of the following disease is not caused  
by virus  
A) T.B  
B) HIV  
Which of the following is a filamentous alga  
A) Ulva  
B) Acetabularia  
Which of the following is not sac fungi  
A) Truffles  
B) Mushrooms  
'Cassia fistula' is the scientific name of  
A) Amaltas  
B) Onion  
Phage virus consists of head and  
A) Thorax

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43. Bacteria without any flagella are called  
A) Motile coccus  
B) Peritrichous  
44. Protists have been evolved from  
A) Animals  
B) Fungi  
45. Algae differ from plants in that the sex organs  
in algae are  
(A) Multicellular  
(B) Unicellular  
46. Fungi can absorb food from the substrate  
because they have  
(A) Sporangium  
(B) Rhizoids  
47. A seed may be defined as a fertilized  
(A) Egg  
(B) Ova  
48. Platyhelminthes means  
A) round worms  
B) tape worms  
49. The first land vertebrates were  
A) Dipnoi  
B) Reptilian  
50. All life on planet earth is powered by  
A) solar energy  
B) tidal energy  
51. Recombinant DNA is introduced in to host cell  
by means of  
A) Phage  
B) Bacteria  
52. In cystic fibrosis, the patient lacks a gene that  
codes for trans-membrane carrier of  
A) sodium ion  
B) chloride ion  
53. Which gene is located on linkage group  
number 11 in man  
(A) sickle cell anemia  
(B) albinism  
54. In birds the sex is determined by the type of  
A) Sperm  
B) Egg  
55. In RNA nucleotides are attached by  
(A) peptide bonds  
(B) covalent bond  
56. The chromosome is  
(A) Gene  
(B) DNA + genes  
57. The human body contains water  
A) 60-80%  
B) 10-90%



58. Environment is a source of  
A) Food  
B) Clothing  
C) 75-95%  
D) 80-90% shelter  
all of these
59. Fresh water ecosystem covers  
A) 2%  
B) 1%  
C) 3%  
D) 5% bacteria  
all of these
60. Foul smell in lake is produced by  
A) Algae  
B) Fungi  
C) 75-95%  
D) 80-90% bacteria  
all of these
61. Starch is richly present in  
A) Onion  
B) Cereals  
C) 75-95%  
D) 80-90% apple  
tomato
62. Plants having foreign DNA are known as  
A) genetic plants  
B) cultured plants  
C) 75-95%  
D) 80-90% recombinant plants  
transgene plants
63. Which of the following kinds of atom do not occur in carbohydrates  
A) Carbon  
B) Nitrogen  
C) 75-95%  
D) 80-90% hydrogen  
oxygen
64. The basic framework of all types of membranes are  
A) Lipoproteins  
B) Proteoglycans  
C) 75-95%  
D) 80-90% glycoproteins  
nucleoproteins
65. Single membrane bounded organelle is  
A) Nucleus  
B) Ribosome  
C) 75-95%  
D) 80-90% lysosome  
none of these
66. Irregular grape like cluster of bacilli is called  
A) diplo bacilli  
B) staphylo bacilli  
C) 75-95%  
D) 80-90% strepto bacilli  
none of these
67. It is generally accepted that plants arose from  
ancestral  
A) green algae  
B) bacteria  
C) 75-95%  
D) 80-90% fungi  
all of these
68. Main energy reserves in the case of green algae are  
A) Glycogen  
B) Glucose  
C) 75-95%  
D) 80-90% sucrose  
starch
69. The chief component of the cell wall of the majority of fungi is  
A) Pectin  
B) Lignin  
C) 75-95%  
D) 80-90% chitin  
cellulose
70. After pollination the pollens are transferred to which part of the flower  
A) Ovary  
B) Stigma  
C) 75-95%  
D) 80-90% Style  
none of these
71. Glyoxisomes contain enzymes for  
A) glyoxylate cycle  
B) Calvin cycle  
C) 75-95%  
D) 80-90% glycolate cycle  
none of these

72. Vacuoles serve to  
A) expand the plant cells  
B) sites for storage  
C) both in expansion and storage  
D) non-specific function
73. An isolated virus is not considered living since it  
A) separate into two parts  
B) cannot metabolize  
C) rapidly loses its genome  
D) all of these
74. The predominant phycobillin pigment in cyanobacteria which is of blue colour is  
A) Phycoerythrin  
B) Fucoxanthin  
C) 75-95%  
D) 80-90% hycocyanin  
fucoxanthin
75. Deafness is caused by misuse of  
A) Penicillin  
B) Paracetamol  
C) 75-95%  
D) 80-90% tetracycline  
streptomycin
76. Cell envelope does not include  
A) Capsule  
B) cell wall  
C) 75-95%  
D) 80-90% slime layer  
cell membrane
77. Coenocytes is a fungal body which is  
A) multi-nucleate aseptate  
B) multi-nucleate septate  
C) uni-nucleate septate  
D) uni-nucleate aseptate
78. Bryophytes are  
A) all heterosporous  
B) mostly homosporous  
C) 75-95%  
D) 80-90% all homosporous  
none of these
79. Nephridia are excretory organs in  
A) round worms  
B) earth worm  
C) 75-95%  
D) 80-90% lizard  
planaria
80. Which one is harmful mollusks  
A) Slug  
B) Oyster  
C) 75-95%  
D) 80-90% snail  
star fish
81. Which structure is involve in gaseous exchange of plants  
A) Stomata  
B) Cuticle  
C) 75-95%  
D) 80-90% lenticels  
all of these
82. Common feature of human and insect trachea is  
A) non-collapsible wall  
B) supporting rings  
C) endodermal origin  
D) ectodermal origin
83. Vomiting occurs due to  
A) Constipation  
B) Antiperistalsis  
C) 75-95%  
D) 80-90% diarrhea  
peristalsis
84. Photosynthetic prokaryotes lack  
A) Ribosomes  
B) cell-membrane  
C) 75-95%  
D) 80-90% chloroplast  
vacuole

Which of the following organ is because of absence of teeth in birds

- A) Crop                      syrinx  
B) Stomach                  gizzard

The scientific name of jelly fish is

- A) Aurelia                  Madrepore  
B) Actinia                  Obelia

In which plants leaves are always in whorls

- A) Lycopods              psilopods  
B) Sphenopods          pteropods

In bacterial and viral infection, there is increase in number of

- A) Platelets              RBC's  
B) Antibodies            WBC's

In plants, which are involved in testa formation

- A) Tracheids              sclereids  
B) Sclerenchyma        none of these

The etiolated plants lack

- A) Chlorophyll            xanthophyll  
B) Caroteins              none of these

Highly intelligent mammals are

- A) Rat                      bat  
B) Dolphin                elephant

Plants absorb most part of water needed by

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- them through their  
A) Stem                      root hairs  
B) Leaf                      bark

93. One of the following is not a function of bones

- A) Support  
B) production of blood cells  
C) protein synthesis      muscle attachment

94. Movement of cell against concentration gradient is called

- A) active transport      osmosis  
B) diffusion                both B and C

95. Pollination is best defined as

- A) germination of pollen grains  
B) transfer of pollen from anther to stigma  
C) formation of pollen grains  
D) none of these

96. DNA structure was first described by

- A) Pasteur                  Robert Koch  
B) Watson and Crick      Carlous Linnaues

97. The most abundant element in the Earth's atmosphere is

- A) Oxygen                  Nitrogen  
B) Hydrogen                Carbon dioxide  
C) None of these

1. A standing wave pattern is formed when the length of string is an integral multiple of \_\_\_\_\_ wavelength.  
A) Triple B) Full C) Half D) Double
2. Which of the following lights travels the fastest in optical fibers?  
A) Visible light B) Invisible infra-red C) Ultra-violet D) Ordinary light  
Hint: The infra-red light will travel the fastest. short wavelengths bounce back and forth across the fiber increasing the total path length from end to end
3. The algebraic sum of potential changes in a closed circuit is zero is Kirchhoff's \_\_\_\_\_ rule.  
A) First B) Second C) Third D) None of these
4. In LED when an electron combines with \_\_\_\_\_ during forward bias conduction, a photon of visible light is emitted.  
A) High voltage B) Photon C) Hole D) Positron
5. For photons of energy greater than 1.02 MeV the probability of pair production occurrence \_\_\_\_\_ as the energy increases.  
A) Increase B) Reduces to half C) Completely diminishes D) Remains unchanged
6. The neutron is assumed to be made of;  
A) One up quark and two down quarks  
B) Two up quarks and one down quark  
C) Two up quarks and two down quarks  
D) One up quark and one down quark
7. An \_\_\_\_\_ missile is called a ballistic missile.  
A) Un-powered and guided B) Powered and guided C) Un-guided and powered D) Un-powered and unguided
8. For atomic hydrogen spectrum, which of the following series lies in visible region of electromagnetic spectrum?  
A) Lyman series B) Balmer series C) Paschen series D) Hohl series
9. Beta ray emitted by a radioactive substance is:  
A) An electron which was existing outside the nucleus  
B) An electron which was existing inside the nucleus  
C) An electron emitted by the nucleus as a result of

- D) the decay of neutron inside the nucleus
10. An electric charge in uniform motion produces  
A) An electric field B) A magnetic field C) Both magnetic and electric fields D) Neither magnetic nor electric fields
11. What is emitted by a hot metal filament in a cathode ray tube?  
A) X-ray B) Electron C) Proton D) Photon
12. The centre of Newton rings is dark due to;  
A) Polarization B) Constructive interference C) Destructive interference D) Reflection
13. Resistance in RC circuit of time constant 2 seconds is 1000 Ohms. What is value of C in the circuit?  
A) 2  $\mu$  farad B) 200  $\mu$  farad C) 20  $\mu$  farad D) 2000  $\mu$  farad
14. The Lenz's law refers to induced  
A) Emf B) Resistance C) Shear D) Currents
15. In which of the following, output is similar to NAND gate if input A=0 and input B=1.  
A) NOR B) XNOR C) XOR D) Both B and C
16. \_\_\_\_\_ are the particles that experience strong nuclear force.  
A) Electrons B) Neutrinos C) Muons D) Neutrons
17. The vertical velocity of ball thrown upward \_\_\_\_\_ with time.  
A) Decreases linearly B) Doubles C) Remains constant D) Decreases parabolically
18. The force required to bend the normally straight path of a particle into a circular path is called \_\_\_\_\_ force.  
A) Traveling B) Centrifugal C) Bending D) Centripetal
19. A disc at rest without slipping, rolls down a hill of height (3 x 9.8) m. What is its speed in m/sec when it reaches at the bottom?  
A) 11.4 B) 22.8 C) 19.6 D) 9.8
20. Tuning of the radio is the best example of electrical \_\_\_\_\_.  
A) Resonance B) Current C) Resistance D) None of these

Two cylinders of equal mass are made from same material. The one with the larger diameter accelerates \_\_\_\_\_ the other under the action of same torque.

- A) Faster than  
C) Slower than

- B) Equal to  
D) None of these

The angular frequency of simple pendulum is directly proportional to \_\_\_\_\_

- A)  $\sqrt{l}$   
C)  $1/l$

- B)  $\sqrt{l}$

- D)  $\sqrt{1/l}$

Two waves of slightly different frequencies and traveling in same direction produce \_\_\_\_\_

- A) Interference

- B) Stationary waves

- C) Polarization

- D) Beats

A single mode step index fibre has core of about \_\_\_\_\_  $\mu\text{m}$  diameter.

- A) 50 to 1000

- B) 30

- C) 50

- D) 5

A 5 Ohm resistor is indicated by a Single \_\_\_\_\_ color band around its body.

- A) Red

- B) Blue

- C) Green

- D) Brown

Practically \_\_\_\_\_ current flows in a reverse biased p-n junction.

- A) No

- B) Very large

- C) Few milliamperes.

- D) Both A and C

In a step-down transformer the output current \_\_\_\_\_

- A) Is reduced

- B) Remains same

- C) Is increased

- D) None of these

Force in terms of base units is expressed as \_\_\_\_\_

- A)  $\text{kg ms}^{-2}$

- B)  $\text{kg m}^2 \text{s}^{-3}$

- C)  $\text{kg m}^2 \text{s}^{-2}$

- D) None of these

100 joules work has been done by an agency in 10 seconds. What is power of agency?

- A) 1000 watt

- B) 10 watt

- C) 100

- D) 0.10 watt

The acceleration is proportional to the displacement and is directed towards mean position in \_\_\_\_\_ motion.

- A) Gravity

- B) Uniform

- C) Simple harmonic

- D) Projectile

In gases, the speed of sound is inversely proportional to \_\_\_\_\_ of the density when other factors are same.

- A) Square root

- B) Third power

- C) Square

- D) Third root

A watch maker uses \_\_\_\_\_ to repair the watches.

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- A) Telescope

- B) Convex lens

- C) Convex mirror

- D) Concave lens

33. A 2m long pipe is open at both ends. What is its harmonic frequency?

- A) 42.5 Hz

- B) 85 Hz

- C) 220 Hz

- D) None of these

34. A wire has resistance 100 Ohm at  $0^\circ\text{C}$  and 200 Ohm at  $100^\circ\text{C}$ . What is its temperature coefficient in  $\text{K}^{-1}$ ?

- A) 0.01

- B) 0.01

- C) 1.273

- D) 1/273

35. The net magnetic field created by the electrons within an atom is due to the field created by their \_\_\_\_\_ motion.

- A) Orbital

- B) Orbital & spin

- C) Spin

- D) Orbital & spin

36. At high temperature, the proportion of \_\_\_\_\_ wavelength radiation increase.

- A) AM radio

- B) Shorter

- C) Long radio

- D) Both A and C

37. In photoelectric effect removal of photons is observed at \_\_\_\_\_ energies.

- A) Low

- B) Intermediate

- C) High

- D) Both A and C

38. Which device is the most efficient?

- A) Nuclear reactor

- B) Silicon solar cell

- C) Storage battery

- D) Dry battery cell

39. The units of E in  $E=mc^2$  are

- A)  $\text{kg m s}^{-2}$

- B)  $\text{kg m}^2 \text{s}^{-2}$

- C)  $\text{N m s}^{-2}$

- D) Both B and C

40. Work done on a body equals change in its \_\_\_\_\_ energy.

- A) Total

- B) Kinetic.

- C) Potential

- D) All of these

41. A pipe varies uniformly in diameter from 2 m to 4 m. An incompressible fluid enters the pipe with velocity 16m/sec. What is velocity of fluid when it leaves the pipe?

- A) 64 m/sec

- B) 8 m/sec

- C) 32 m/sec

- D) 4 m/sec

42. Transverse waves cannot be setup in \_\_\_\_\_

- A) Metals

- B) Fluids

- C) Solids

- D) Soil

43. The ratio of the \_\_\_\_\_ is called magnification.

- A) Image size to object size

- B) Lycopodium size to object size

- C) Object size to image size

- D) None of these

44. Which of the following has the highest resistivity?



45. An n-type semi-conductor is made by doping silicon crystal with \_\_\_\_\_  
 A) Indium  
 B) Copper  
 C) Aluminum  
 D) Platinum
46. Objects cannot be accelerated to the speed of light in free space is consequence of \_\_\_\_\_  
 A) Mass variation  
 B) Inertia forces  
 C) Energy-mass relationship  
 D) All of these
47. A certain radioactive mass decays from 64 gm to 2 gm in 20 days. What is its half-life?  
 A) 5 days  
 B) 10 days  
 C) 4 days  
 D) 6 days
48. If inductance is denoted by  $L$  and resistance by  $R$ , which of the following is true for a choke?  
 A)  $R$  is large,  $L$  is very small  
 B) Both  $R$  and  $L$  are large  
 C)  $R$  is very small,  $L$  is large  
 D) Both  $R$  and  $L$  are very small
49. A force  $2i + j$  has moved its point of application from  $(2, 3)$  to  $(6, 5)$ . What is work done?  
 A) -10  
 B) -18  
 C) +10  
 D) +18
50. The escape velocity corresponds to \_\_\_\_\_ energy gained by body, which carries it to an infinite distance from the surface of earth.  
 A) Total  
 B) Initial kinetic  
 C) Potential  
 D) None of these
51. The drag force decreases as the speed of an object moving through fluid;  
 A) Increases  
 B) Remains constant  
 C) Decreases  
 D) Both B and C
52. Light year is a measure of \_\_\_\_\_  
 A) Distance  
 B) Intensity of light  
 C) Time  
 D) Velocity
53. A yellow light of wavelength 500 nm emitted by a single source passes through two narrow slits 1 mm apart. How far apart are two adjacent bright fringes when interference is observed on a screen 10 m away?  
 A) 5 mm  
 B) 1.33 mm  
 C) 0.5 mm  
 D) 50 mm
54. The heat produced by a current  $I$  in the wire of resistance  $R$  during time interval  $t$  is  
 A)  $I^2 R t$   
 B)  $I^2 R t$   
 C)  $I^2 R t$   
 D)  $I R^2 t$
55. Radian is a unit of angular displacement which can also be measured in degrees. How many

- radians are equal to one degree?  
 A)  $180\pi$   
 B)  $\pi/180$   
 C)  $2\pi/180$   
 D)  $\pi/57.3$
56. An elevator is moving upwards with constant velocity of ' $v$ '. What is a weight of a person of mass ' $m$ ' inside the elevator during upward motion?  
 A)  $mg + mv$   
 B)  $mg$   
 C)  $mg - mv$   
 D) zero
57. An object having spherical shape of radius  $r$  experiences a retarding force  $F$  from a fluid of coefficient of viscosity ' $\eta$ ' when moving through the fluid with speed ' $v$ '. What is the ratio of retarding force to speed?  
 A)  $6\pi\eta r^2$   
 B)  $6\pi\eta/r^2$   
 C)  $6\pi\eta r$   
 D)  $6\pi\eta/r$
58. When the drag force is equal to the weight of the droplet, the droplet will fall with:  
 A) High Speed  
 B) Certain acceleration  
 C) Low Speed  
 D) Constant Speed
59. A simple pendulum length ' $L$ ' with bob of mass ' $m$ ' is slightly displaced from its mean position so that it string makes an angle ' $\theta$ ' with vertical line as shown in the figure. Then bob of pendulum released. What will be the expression of torque with which the bob starts to move towards the mean position?  
 A)  $mgL$   
 B)  $mgL \sin \theta$   
 C) 0  
 D)  $mgL \cos \theta$
60. The density of blood is:  
 A) Less than water  
 B) Greater than water  
 C) Nearly equal to water  
 D) Three times that of water
61. For interference of light waves to take place, the required condition is:  
 A) The path difference of the light waves from the two sources must be large  
 B) The interfering waves must be non-coherent  
 C) The light waves may come from different sources  
 D) The light waves must come from two coherent sources
62. The property of bending of light around an obstacle and spreading of light waves into geometric shadow of an obstacle is called:  
 A) Diffraction of Light  
 B) Quantization of Light  
 C) Polarization of light  
 D) Interference of Light

70. The normal human eye can focus a sharp image of an object on the eye if the object is located at a certain distance called:
- Least Point
  - Near Point
  - Far Point
  - Distinct Point
71. A source of sound wave emits waves of frequency  $f$ . If  $v$  is speed of sound waves, then what will be the wavelength of the waves:
- $\lambda$
  - $\frac{v}{f}$
  - $\frac{f}{v}$
  - $\frac{1}{f}$
72. The spectrum of a star's light is measured and the wavelength of one of the lines as the sodium's line is found to be 589 nm. The same line has the wavelength of 497 nm when observed in the laboratory. This means the star is:
- Moving away from the earth
  - Stationary
  - Moving towards the north
  - Revolving around the planet
73. What is the period of mass spring system during SHM if the ratio of mass to spring constant is  $\frac{1}{4}$ ?
- $\pi$
  - $2\pi$
  - $\frac{1}{\pi}$
  - $\frac{1}{2}\pi$
74. A wire is stretched by a force which causes an extension. The energy is stored in it only when:
- The extension of wire is proportional to force applied
  - The cross-section area of the wire remains constant
  - The wire is not stretched beyond its elastic limit
  - The weight of wire is negligible
75. Which statement is correct:
- Elasticity is that property of body which enables body to regain its original dimension
  - Elasticity is that property of a body that does not allow it to return to its original shape
  - Elasticity is that property of a body that allows it to retain its original shape and dimension after the stress is removed.
  - Elasticity is that property of a body that obeys Hooke's law
76. For a gas of volume  $V$  in its equilibrium state, if the pressure does change with time then total kinetic energy of gas is constant because
- Collisions between gas molecules occur
  - Collisions must be elastic
  - Collisions between gas molecules occur linearly
  - Collisions must be inelastic

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70. Which of the following is the proper way to study the sinusoidal waveform of the voltage?
- Voltage is connected to X input and the time base is switched off
  - Voltage is connected to Y input and the time base is switched on
  - Voltage is connected to Y input and the time base is switched off
  - Voltage is connected to X input and the time base is switched on
71. Electron gun in cathode ray oscilloscope contains
- Filament, cathode, grid, anodes
  - Emitter base, collector
  - Cathode, anode, capacitor, screen
  - Resistance, capacitor, inductor
72. If 2 A current passes through a resistor when connected to a certain battery. If the resistance is replaced by the double resistance, then the current will become:
- 2 A
  - 4 A
  - 6 A
  - 1 A
73. In Helium-Neon laser, population inversion of atoms is achieved which emit radiations, when they are stimulated to fall at lower level.
- Neon
  - Helium
  - Helium and Neon
  - Chromium
74. Three resistors each having value 'R' are connected in series. What is the equivalent resistance?
- 3R
  - R
  - $\frac{R}{3}$
  - $\frac{R}{3}$
75. If the number of turns of a solenoid circular coil is doubled, but the current in the coil and radius of the coil remains same, then what will be the magnetic flux density produced by the coil?
- Magnetic flux density will be halved
  - Magnetic flux density increases by different amount at different points
  - Magnetic flux density remains unchanged
  - Magnetic flux density will be doubled
76. Two long parallel wires Wire 1 and Wire 2 repel each other as shown in the figure. What could be the reasons?
- Both carry current in same direction
  - Wire 1 has current, but Wire 2 has no current
  - Both carry current in opposite direction
  - Wire 2 has current, Wire 1 has no current
77. Wavelength of X-rays is the order of:
- $10^3$  m
  - $10^{-8}$  m
  - $10^{-10}$  m
  - 100 m

78. Laser beam can be used to generate three-dimensional image of object in a process called:
- A) Computed technology B) Holography  
C) Computed tomography D) Computerized axial tomography
79. Which of the following is true for Lasers?
- A) Electrons are emitted  
B) Coherent monochromatic light is emitted  
C) Stimulated emission of electrons is needed  
D) There is a population inversion of photons
80. What is meant by spontaneous emission of electrons in solids?
- A) Electrons being emitted by the solids through photoelectric effect when irradiated with electromagnetic radiation  
B) Incident electrons colliding with electrons in solids and releasing doubling the number of incident electrons  
C) Electrons in solids are emitted without any external stimulus through radiation  
D) Excited electrons going back to lower energy states immediately by releasing energy
81. The characteristic X-ray spectrum is due to:
- A) The absorption of neutrons by target material  
B) The bombardment of target material by electrons  
C) The bombardment of target material by protons  
D) The bombardment of target material by alpha particles
82. Ionizing capability of gamma rays is:
- A) Equal to alpha and beta particle  
B) Less than both alpha and beta particles  
C) Less than alpha but greater than beta particles  
D) Less than beta but greater than alpha particles
83. Half-life of a radioactive element is:
- A) Inversely proportional to square of decay constant  
B) Directly proportional to decay constant

- C) Directly proportional to square of decay constant  
D) Inversely proportional to decay constant
84. The transformation of a neutron into proton in the nucleus gives rise to emission of:
- A) Beta particles B) Alpha particles  
C) Gamma particles D) X rays
85. The ratio of the rate of decay of a parent atom to the number of radioactive nuclei present at that time is equal to:
- A) Half-life of radioactive element  
B) Decay constant of radioactive element  
C) Mean life  
D) Activity of radioactive element
86. Which one of the following particle is emitted as a result of nuclear reaction?
- A) Beta B) Alpha  
C) Gamma rays D) One alpha and one beta
87. Which of following is used to estimate the circulation of blood in a patient?
- A) Carbon-14 B) Carbon-12  
C) Phosphorus-32 D) Sodium-24
88. For the radiotherapy of a patient, it is required to double the absorbed dose in gray. What step may be taken?
- A) Energy must be quadrated  
B) Energy must be raised four times  
C) Energy must be halved  
D) Energy must be doubled
89. In population inversion (Ruby Laser) atoms can reside in the excited state for:
- A)  $10^{-1}$  s B)  $10^{-6}$  s  
C)  $10^{-3}$  s D)  $10^{-1}$  s
90. If electrons of charge 'e' moving with velocity 'v' are accelerated through a potential difference 'V' and strike a metal target, then velocity of electron is:
- A)  $\sqrt{Ve}$  m B)  $\sqrt{Ve}$  m  
C)  $\sqrt{Ve}2m$  D)  $\sqrt{2Ve}$  m



## Key &amp; Hints of NUMS Biology

B

D

**Hint:** The sodium-potassium pump is a mechanism of active transport that moves sodium ions out of the cell and potassium ions into the cells.

B

**Hint:** Hemodialysis is a treatment to filter wastes and water from your blood, as your kidneys did when they were healthy. Hemodialysis helps control blood pressure and balance important minerals, such as potassium, sodium, and calcium, in your blood.

A

**Hint:** Skin has two types of sweat glands: eccrine and apocrine. Eccrine glands occur over most of your body and open directly onto the surface of your skin. Apocrine glands open into the hair follicle, leading to the surface of the skin.

C

**Hint:** dogs pant, especially when they're hot, excited, or energetic. Therefore, for evaporative cooling in the respiratory tract of dog, panting is done by the dogs.

Panting is different, though, and may be a sign your dog is dangerously overheated, coping with a chronic health problem, or has experienced a life-threatening trauma.

**Extra Hint:** Vasoconstriction is the narrowing of the blood vessels.

6 A

**Hint:** bacteria can be killed in the body by antibiotics. Antibiotics can't kill viruses.

7 A

**Hint:** there are two process of osmotic pressure due to which the water flow occurs in or out of the body of the plant called hypo and hypertonic. Where there is isotonic then there is no in or out of the water molecules.

8 C

**Hint:** dehydration synthesis, which means "to put together while losing water." protein synthesis also occur by dehydration synthesis.

9 B

**Hint:** Glucose is the organic compound found in all living cells.

10 B **HINT:** most of the compounds in the body are made of C, O, H, N

11 C

**Hint:** Diastase is a group of enzymes that catalyzes the breakdown of starch into maltose.

12 B

13 A

14 D

15 A

16 C

17 A

18 C

19 D

20 C

21 A

**Hint:** Cuscuta is the plant which bends around the other plants and suck food from it.

B	30. A	38. A	46. C	54. C	62. D	70. C	78. B	86. A	94. A
D	31. D	39. D	47. C	55. D	63. C	71. A	79. C	87. C	95. B
C	32. A	40. C	48. B	56. B	64. A	72. C	80. A	88. D	96. C
B	33. B	41. A	49. B	57. B	65. C	73. B	81. D	89. B	97. B
C	34. C	42. C	50. A	58. D	66. C	74. B	82. A	90. A	
A	35. D	43. B	51. B	59. B	67. A	75. D	83. C	91. C	
D	36. A	44. D	52. C	60. D	68. D	76. D	84. B	92. B	
B	37. C	45. B	53. D	61. C	69. B	77. A	85. D	93. C	

## PHYSICS KEY

**Hint:** Standing waves of many different lengths can be produced on a string with two fixed ends, as long as an integral number of half wavelengths fits into the length of the string.

**Hint:** The infra-red light will travel the fastest.

short wavelengths bounce back and forth across the fiber increasing the total path length from end to end.

3. B **Hint:** Second rule is Kirchhoff's Voltage Law.

4. C **Hint:** When a junction diode is forward biased, energy is released at the junction due to recombination of electrons and holes.

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- Hint:** 1.02 MeV is the threshold energy for pair production. For photon energies above the threshold, a photon has more than enough energy to create a particle pair and the surplus energy appears as kinetic energy of the two particles.
6. **A** **Hint:** one neutron is made of one up and two down quarks
7. **D** **Hint:** Ballistic missile, a rocket-propelled self-guided strategic-weapons system that follows a ballistic trajectory to deliver a payload from its launch site to a predetermined target. Ballistic missiles can carry conventional high explosives as well as chemical, biological, or nuclear munitions
8. **B** **Hint:** Lyman series of hydrogen atom lies in the ultraviolet region, Balmer series lies in visible region, Paschen series lies in near infrared region whereas Brackett, Pfund as well as Humphrey series lie in far infrared region of electromagnetic spectrum.
9. **B** **Hint:** When a neutron strikes with the heavy Uranium nucleus, it emits beta radiations, its atomic number changes and it emits some energy during this process.
10. **C** **Hint:** The presence of charge produces electric field and a uniformly moving charge generates current which produces magnetic field. Thus a uniformly moving charge produces both electric and magnetic field
11. **B** **Hint:** The charged particles in the hot cathode ray tube are fast moving electrons in the form of a beam which is produced by the thermionic emission effect from a metal surface.
12. **C** **Hint:** The two reflected rays will interfere according to the total phase change caused by the extra path length  $2t$  and by the half-cycle phase change induced in reflection at the lower surface. When the distance  $2t$  is less than a wavelength, the waves interfere destructively, hence the central region of the pattern is dark.
13. **D** **Hint:** As  $t = RC$  thus  $C = t/R = 2/1000 = 0.002$  farad = 2000  $\mu$  farad
14. **D** **Hint:** Lenz's law, in electromagnetism, statement that an induced electric current flows in a direction such that the current opposes the change that induced it. This law was deduced in 1834 by the Russian physicist Heinrich Friedrich Emil Lenz (1804-65)
15. **C** **Hint:** As XOR gives output 1 if it has odd number of 1s
16. **D** **Hint:** Hadrons are particles that feel the strong

nuclear force, whereas leptons are particles that do not. The proton, neutron, and the pions are examples of hadrons. The electron, positron, neutrino, and antineutrino are examples of leptons, meaning low mass

17. **B**  
**Hint:** In case of Projectile motion, a body is projected upward having horizontal component of velocity constant but vertical component of velocity decreases during upward motion and increases during downward motion  
 $v = u - gt$
18. **D** **Hint:** A centripetal force is a force that makes a body follow a curved path
19. **C**  
**Hint:** The easiest way to solve these problems is to apply conservation of energy. The disc at rest has potential energy. If we define the datum (height) at the bottom of the hill, then the disc will have potential energy at the bottom of the hill. All the potential energy will be converted to linear kinetic energy as well as rotational kinetic energy.  
 $PE = (KE)_{\text{linear}} + (KE)_{\text{rotational}}$   
 $mgh = 1/2mv^2 + 1/2I\omega^2$  — equation 1  
but the mass moment of inertia of a disc about a rotating axis is  $I = 1/2mR^2$   
and the angular velocity  $\omega = v/R$   
equation 1 becomes:  
 $mgh = 1/2mv^2 + 1/2(1/2mR^2)(v/R)^2$   
or  
 $mgh = 1/2mv^2 + 1/4mv^2$   
or  
 $mgh = 3/4mv^2$   
or  
 $gh = 3/4v^2$   
 $(9.8)(3)9.8 = 3/4v^2$   
or  
 $(9.8)9.8 = 1/4v^2$   
take square root of both sides gives:  
 $9.8 = 1/2v$   
 $v = 2(9.8) = 19.6 \text{ m/s}$
20. **A** **Hint:** Radio tuning is the best example of electrical resonance as the frequency matches with the natural frequency of the system.
21. **A** **Hint:** More diameter, more acceleration and less diameter less acceleration
22. **D**
23. **D** **Hint:** Slight difference in frequencies travelling in the same direction produces beats
24. **D**

Hint:  $F = ma = \text{kg m s}^{-2}$

Hint: As  $P = W/t = 100/10 = 10 \text{ Watt}$

Hint: In SHM, acceleration  $\propto x^2$  and always directed towards mean position

Hint:  $v \propto 1/\sqrt{\rho}$

Hint: The reason is a convex lens act as a magnifying lens when the object is positioned between  $f$  and  $(2f)$ . So, watchmaker would use a convex lens in order to be able to magnify the tiny parts of a watch and view them effectively.

Hint: As  $v = f\lambda$  so  $f = v/\lambda$

Sound travels with a speed of 340 m/s and in an open pipe, the length of the pipe contains half of a wavelength, so a sound of wavelength 4m will be produced  
 $f = 340/4 = 85$ , so the harmonic frequency will be 85 Hz

Hint: Initial temperature =  $0^\circ\text{C} = 273\text{K}$

Final temperature =  $100^\circ\text{C} = 373\text{K}$

$$\Rightarrow \Delta R = R \times \alpha \times \Delta T$$

$$\Rightarrow (R_2 - R_1) = R_1 \times \alpha \times (T_2 - T_1)$$

$$\Rightarrow (200-100) = 100 \times \alpha \times (373-273)$$

$$\Rightarrow 100 = 100 \times \alpha \times 100$$

$$\Rightarrow \alpha = 1/100 = 0.01 \text{ K}^{-1}$$

$$\Rightarrow \alpha = 1 \times 10^{-2} \text{ K}^{-1}$$

Hint: The net magnetic field created by the electrons within an atom is the product of both its orbital and spin motion.

Hint: Smaller wavelength radiation leads to microscopic level excitation whereas longer wavelength radiation leads to macroscopic excitation (macroscopic movement, which is related to temperature).

Hint: In photoelectric effect, removal of photons is observed at both intermediate and high energies because at low energy photons cannot be removed or

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ejected out of the metal surface

38. A

Hint: Among the mentioned devices, nuclear reactor is the most efficient one

39. B

Hint: As  $F = ma = \text{kg (m/s)}^2 = \text{kgm s}^{-2}$

40. B

Hint: According to Work Energy Principle total work done by a body is equal to the change in its Kinetic Energy.

41. D

Hint: As  $\frac{V_2}{V_1} = \frac{a_1^2}{a_2^2}$  thus  $V_2 = \frac{a_1^2}{a_2^2} \times V_1$

$$V_2 = (2)^2 \times 16 / (4)^2 = 4 \times 16 / 16 = 4 \text{ m/s}$$

42. B

Hint: Transverse waves cannot be setup in fluids.

43. A

Hint: Magnification =  $\frac{\text{Image size}}{\text{Object size}}$

44. A

Hint: Resistivity of Germanium =  $4.6 \times 10^{-1}$

45. B

Hint: As Arsenic belongs to Group V so it has five valence electrons. By doping silicon with group V elements will make n-type materials.

46. D

Hint: All the factors are involved.

47. C Hint: As in first 4 days = 32 g left

Next 4 days = 16 g left

Next 4 days = 8 g left

Next 4 days = 4 g left

Next 4 days = 2 g left

Total days =  $4 \times 5 = 20$  days

48. C

Hint: Ideal choke coil has  $R = 0$  otherwise it will consume more power and L is very high compared to  $R$ .  $L \gg R$

49. C

Hint: Force =  $2i + j$

Let the displacement be d.

The difference between the two points will be our distance.

$$d = 5i + 6j - 2i - 3j$$

$$d = 3i + 3j$$

If we apply force and there will be displacement then it is called work.

So work = force \* displacement

Moreover work is a scalar quantity.

$$W = (2i + j) \cdot (3i + 3j)$$

$$W = 6 + 3$$

$$W = 9 \text{ J approximately } 10 \text{ J}$$

50. B: Hint: As when the two masses are infinitely apart, their potential energy is zero.

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- Hint: According to Stoke's Law,  
 $F_D = 6\pi \eta r v$  thus  $F_D \propto v$
52. A  
 Hint: Distance travelled by light in 1 year is light year.
53. A  
 Hint:  $Y_m = D (m\lambda/d)$  and  $Y_{m+1} = D [(m+1)\lambda/d]$   
 Two adjacent bright fringe  $= Y_{m+1} - Y_m = \lambda D/d$   
 $d = 1\text{mm} = 10^{-3}\text{m}$ ,  $D = 10\text{m}$ ,  $\lambda = 500 \times 10^{-9}\text{m}$   
 $Y_{m+1} - Y_m = D\lambda/d \rightarrow Y_{m+1} - Y_m = (10 \times 500 \times 10^{-9})/0.001 = 0.005\text{m} = 5\text{mm}$
54. B  
 Hint:  $P = W/t \Rightarrow W = P \times t = IVt = I^2(R)t = I^2Rt$   
 A Hint: As  $2\pi$  radians  $= 360^\circ$   
 1 radian  $= 180^\circ/\pi$
56. B: Hint:  $W = mg$
57. C Hint: According to Stoke's Law,  
 $F_D = 6\pi \eta r v$  thus  $F_D/v = 6\pi \eta r$   
 $F_D/v = 6\pi \eta r$
58. D Hint: When  $F_D = W$ ;  $V_T = \text{Constant}$
59. B  
 Hint: As the bob of the pendulum has two components,  $mg \cos \theta$  which balances tension in the string and  $mg \sin \theta$  which is responsible for the motion of the bob towards mean position  
 Torque  $= L \times F_{\text{net}} = mgL \sin \theta$
60. C  
 Hint: Blood and water densities are nearly equal to each other. Blood density varies in the range  $1043$  to  $1060\text{ kg/m}^3$  while density of water is  $1000\text{ kg/m}^3$ .
61. D  
 Hint: Coherent sources are must for interference because the path difference must be zero.
62. A  
 Hint: The bending of light around an obstacle is diffraction.
63. B  
 Hint: The near point of the eye is the point nearest the eye at which an object can be placed and still have a sharp image produced on the retina. For a normal eye, the near point is located  $25\text{cm}$  from the eye
64. C  
 Hint:  $v = f\lambda$
65. A  
 Hint: when the wavelength of star was measured it resembled to the wavelength of sodium having wavelength  $589\text{nm}$  and when the sodium line was observed in lab and its wavelength was calculated it came out to be  $497\text{nm}$ . This means the wavelength

- had increased and it increases when star moves away. This effect is also called red shift
66. A  
 Hint:  $T = 2\pi \sqrt{\frac{m}{k}}$   
 $T = 2\pi \sqrt{\frac{1}{4}} = 2\pi \times \frac{1}{2} = \pi$
67. A  
 Hint:  $F \propto x$   $F = kx$
68. C  
 Hint: Due to elasticity, a body can regain its shape and original dimension after removal of stress.
69. B  
 Hint: In elastic collisions, K.E remains constant
70. D  
 Hint: With the p.d. across the X-plates (the time base) switched off, a sinusoidal signal makes the spot go up and down, executing simple harmonic motion. With the time-base on, a sine wave is displayed.
71. A  
 Hint: The assembly of the cathode, intensity focus grid, and accelerating anode (positive electrode) is called an electron gun.
72. D  
 Hint: As Resistance and Current are inversely proportional to each other, so by doubling resistance current will be halved.
73. C  
 Hint: In order to achieve population inversion, we need to supply energy to the gain medium. In helium-neon lasers, we use high voltage DC as the pump source. A high voltage DC produces energetic electrons that travel through the gas mixture. The gas mixture in helium-neon laser is mostly composed of helium atoms.
74. A  
 Hint: In series combination,  $R_{\text{eq}} = R + R + R$   
 $R_{\text{eq}} = 3R$
75. D Hint:  $B = \mu n I = \mu N/L I$   
 $B \propto N$  if  $N' = 2N$   $B' = 2B$
76. C  
 Hint: The force is attractive if the currents are in the same direction and repulsive if they are in opposite directions.
77. B  
 Hint: An X-ray has a wavelength of  $1.15 \times 10^{-10}\text{m}$ .
78. B  
 Hint: A hologram is a real world recording of an interference pattern which uses diffraction to reproduce a 3D light field, resulting in an image



which still has the depth parallax and other properties of the original scene

**80. B**  
Hint: A laser is device that emits coherent and monochromatic light. The light is coherent if photons and compose the light are in phase and monochromatic if the photons have a single frequency (color).

**81. B**  
Hint: Characteristic X-rays are produced when an element is bombarded with high-energy particles, which can be photons, electrons or ions (such as protons).

**82. B**  
Hint: Gamma rays have minimum ionizing power but tremendous penetration power.

**83. D**  
Hint: The relation between half-life and decay constant is:  
 $T_{1/2} = 0.693 \lambda$   
 $T_{1/2} \propto 1/\lambda$  where  $\lambda$  is the decay constant

**84. A**  
Hint: Nuclei do not contain electrons and yet during beta decay, an electron is emitted from a nucleus. At

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the same time that the electron is being ejected from the nucleus, a neutron is becoming a proton

**85. B**  
Hint:  $\Delta m c^2 = E$

**86. B**  
Hint: A nuclear reaction is one that changes the structure of the nucleus of an atom. The atomic numbers and mass numbers in a nuclear equation must be balanced.

Since during alpha emission, both the atomic number and atomic mass are changed

**87. D** Hint: A solution of Sodium 24 is dispersed into the human blood

**88. D** Hint: To double the absorbed dose in gray, energy must be doubled.

**89. C**  
Hint: Any excited electrons in  $E_2$  and  $E_1$  in Neon atoms will fall to the ground state in  $10^{-8}$  s.

**90. D**  
Hint:  $\frac{1}{2}mv^2 = Vq$   
i.e.  $\frac{1}{2}mv^2 = Ve$   
 $v^2 = 2eV/m$

$$v = \sqrt{\frac{2eV}{m}}$$

## NUMS - PHYSICS

1. Heavy nuclei of atom goes through fission so that they can:
  - A) Absorb high amount of energy
  - B) Absorb low amount of energy
  - C) Increase their binding energy per nucleon
  - D) Reduce their binding energy per nucleon
2. For projectile motion in the absence of air resistance:
  - A) Vertical speed is constant
  - B) Horizontal force is constant
  - C) Horizontal acceleration is zero
  - D) Vertical acceleration is zero
3. The range of the projectile depends upon the velocity of the projection and the angle of the projection i.e.  $45^\circ$ . For a fixed velocity when the angle of the projection is larger than  $45^\circ$ . Which of the following is correct?
  - A) Both of the height and the range attained by the projectile will be less
  - B) Both the height and the range attained by the projectile will be more

- C) The height attained by the projectile will be less but the range is more
- D) The height attained by the projectile will be more but in range is less
4. The wavelength of the electromagnetic wave having frequency of 3 kHz will be?
  - A) 80 Km
  - B) 140 Km
  - C) 100 Km
  - D) 120 Km
5. An alternating voltage  $V$  (in volts) is represented by the equation:  $V = 300 \sin(100 \pi t)$  what is the value of " $f$ " for this voltage?
  - A) 25 Hz
  - B) 200 Hz
  - C) 50 Hz
  - D) 100 Hz
6. The diameter of a wire is measured by using a micrometer screw gauge with least count of 0.01 mm, then which of the following reading will be correct?
  - A) 0.067 cm
  - B) 0.67 cm
  - C) 0.0067 cm
  - D) 6.70 cm
7. Which is the following statement show that work is done?



- A) Pushing a car to start it moving  
B) Writing an essay on a page  
C) Lifting the weights  
D) The moon orbiting the earth
8. When the length of a simple pendulum is doubled. How ratio of the new time period to old time period?  
A)  $\sqrt{2}$   
B)  $\sqrt{2}$   
C) 2  
D)  $\sqrt{2}$
9. The direction of current through the load resistant of a full-wave rectification circuit.  
A) Invert for negative cycle  
B) Change for every cycle  
C) Invert for positive cycle  
D) Remains constant
10. A wire has a spring constant of  $5 \times 10^4 \text{ Nm}^{-1}$ . It is stretched by a force to extension of 1.4 mm. calculate the strain energy stored in the wire.  
A)  $4.9 \times 10^{-3} \text{ J}$   
B) 4.9 J  
C)  $4.9 \times 10^{-5} \text{ J}$   
D)  $4.9 \times 10^{-2} \text{ J}$
11. If two subject of equal masses "m" are moving towards each other with the same speed "v" then what will be the total final momentum after elastic head on collision?  
A)  $-mv \text{ kg s}$   
B) 4.9 J  
C)  $2MV \text{ Kg s}$   
D) 0 Kg m/s
12. Molecules of a constant pressure for a fixed amount of gas have average kinetic energy X increase temperature from  $27^\circ\text{C}$  to  $327^\circ\text{C}$ . average K.E of a molecules will become:  
A) 200X  
B) 20X  
C) 300X  
D) 2X
13. An automobile is moving forward with uniform velocity due to the force exerted by its Engine. If that force is double with the velocity remaining constant what happens to its total power?  
A) It does not change  
B) It is squared  
C) It is halved  
D) It is doubled
14. In double slit experiment, the fringe spacing of the diffracted rays increase when:  
A) The distance between the slit and the screen decrease  
B) The wavelength of a diffracted rays increase  
C) The distance from mid-point of the slit to the central point of fringes on the screen increase  
D) The distance between the slit increase
15. The area under the extension-load graph of an elastic material whose elastic limit has not been exceeded give its:  
A) Stress  
B) Strain energy  
C) Young modulus  
D) Strain
16. Minimum energy required to eject an electron from metal surface is called:  
A) Work function  
B) Stopping potential  
C) Threshold frequency  
D) Electromotive force
17. The unit of magnet flux density is tesla, "T" it can also be expressed as:  
A)  $1 \text{ N} \cdot \text{A}^{-1} \text{ m}$   
B)  $1 \text{ N} \cdot \text{A} \cdot \text{m}^{-1}$   
C)  $1 \text{ N} \cdot \text{A} \cdot \text{m}$   
D)  $1 \text{ N} \cdot \text{A} \cdot \text{m}$
18. Percentage of uncertainty to length and width of a rectangle is 2% and 3%. The total number certainly in area of that rectangle is?  
A) 1.5%  
B) 5%  
C) 6%  
D) 1%
19. What is the quark composition of proton?  
A) Two up quarks and one down quark  
B) one up quarks and two strange quarks  
C) Two up quarks and one strange quarks  
D) Two down quarks and one up quark
20. What will be the expression for the observed frequency its source is moving towards the observer?  
A)  $f_c = (V - v - u)f$   
B)  $f_c = (v/v - u)f$   
C)  $f_c = (v + u)f$   
D)  $f_c = (v + u)f$
21. Work done due to centripetal force for circular motion will be:  
A) Reduced  
B) Maximum  
C) Half  
D) Zero
22. If we give the direct current to the transformer primary cell, then there will be:  
A) Less emf produced in the secondary  
B) No emf produced in the secondary  
C) Equal emf produced in the secondary  
D) More emf produced in the secondary
23. The value of units of the plank constant "h" can be expressed as:  
A)  $6.63 \times 10^{-34} \text{ Js}^{-1}$   
B)  $6.63 \times 10^{-43} \text{ Js}$   
C)  $6.63 \times 10^{-34} \text{ Js}$   
D)  $3.63 \times 10^{-34} \text{ Js}$
24. A negligible small current between input terminal of the operational amplifier is because of:  
A) Low input resistance  
B) Low output resistance  
C) High output resistance  
D) High input resistance
25. If a conductor of length 7m is placed in a magnetic field of strength 0.3T carrying 1A. parallel to the field. what will the force acting on it due to this magnetic field?

1. Most cell membranes are composed principally of
  - A) DNA and protein
  - B) protein and chitin
  - C) protein and lipids
  - D) protein and RNA
2. Sodium ions are "pumped" from a region of lower concentration to a region of higher concentration in the nerve cells of humans. This process is an example of
  - (A) Diffusion
  - (B) Osmosis
  - (C) passive transport
  - (D) active transport
3. Haemodialysis means cleaning of
  - A) Urine
  - B) glomerular filtrate
  - (C) blood
  - (D) coelomic fluid
4. Production of sweat and sebum is related with
  - A) Skin
  - B) Lungs
  - (C) liver
  - (D) GIT
5. The evaporative cooling in the respiratory tract of dogs is called
  - A) Vasodilation
  - B) Panting
  - (C) vasoconstriction
  - (D) all of these
6. Which of the following pathogen type cause disease that can be treated with antibiotics?
  - A) Bacteria
  - B) Virus
  - (C) fungi
  - (D) none of these
7. Normally, in the process of osmosis, the net flow of water molecules into or out of the cell depends upon differences in the
  - A) concentration of water molecules inside and outside the cell
  - B) concentration of enzymes on either side of the cell membrane
  - C) rate of molecular motion on either side of the cell membrane
  - D) none of these
8. Proteins are made from amino acids by the process of
  - (A) Hydrolysis
  - (B) dehydration synthesis
  - (C) active transport
  - (D) pinocytosis
9. Which is an organic compound found in most cells?
  - A) Water
  - B) Oxygen
  - (C) glucose
  - (D) sodium chloride
10. Which are the four most abundant elements in living cells?
  - (A) carbon, oxygen, nitrogen, sulfur
  - (B) carbon, oxygen, hydrogen, nitrogen
  - (C) carbon, oxygen, sulfur, phosphorus
  - (D) carbon, sulfur, hydrogen, magnesium
11. Starch is converted into maltose by
  - A) Diastase
  - B) Maltase
  - (C) invertase
  - (D) amylase
12. Co-enzyme is often formed from
  - A) Lipid
  - B) inorganic ion
  - (C) protein
  - (D) vitamin
13. Messenger RNA is formed in
  - (A) Nucleus
  - (B) Mitochondria
  - (C) chloroplast
  - (D) none of these
14. Number of chromosomes in E. coli
  - A) 4
  - B) 3
  - (C) 6
  - (D) 1
15. Protein factory is
  - A) Nucleus
  - B) Golgi complex
  - (C) ribosome
  - (D) centriole
16. Smallest disease causing agents in plants are
  - A) Virion
  - B) Viroids
  - (C) mycoplasma
  - (D) prions
17. The major cell infected by the HIV is
  - A) helper-T
  - B) both T and B
  - (C) B
  - (D) none of these
18. Pigment present in red algae is
  - A) Fucoxanthin
  - B) Phycoerythrin
  - (C) phycocyanin
  - (D) bilirubin
19. Nutrition in fungi is
  - A) Photosynthetic
  - B) completely parasitic
  - (C) chemosynthetic
  - (D) absorptive heterotroph
20. Fungi resemble plants because they lack
  - A) cell wall
  - B) centriole
  - (C) cytoplasm
  - (D) nucleus
21. Which is a parasitic plant
  - A) Cuscuta
  - B) Ferns
  - (C) rose
  - (D) mosses
22. True roots absent in
  - (A) Ferns
  - (B) Gymnosperms
  - (C) bryophytes
  - (D) angiosperms
23. The mechanism for ATP synthesis is
  - (A) Chemosynthesis
  - (B) Phosphorylation
  - (C) photosynthesis
  - (D) chemiosmosis
24. Enzyme present in the saliva is
  - (A) Lipase
  - (B) Ptyalin
  - (C) trypsin
  - (D) invertase
25. Nitrogen is present in
  - (A) Carbohydrates
  - (B) Lipids
  - (C) proteins
  - (D) carbonates
26. The food is ground in the cockroach in
  - (A) Mesenteron
  - (B) crop

## Chapter 20: Nuclear Physics

NUMS and National MDCAT by Ali Sudais

- The binding energy for nucleus A is 7.7 MeV and that for nucleus B is 7.8 MeV. Which nucleus has the larger mass?
- A) Nucleus A  
B) Nucleus B  
C) Less than nucleus A  
D) None
- How many neutrons are there in the nuclide  $^{146}_{52}\text{Sn}$ ?
- A) 22  
B) 30  
C) 36  
D) 66
- Mass equivalent of 931 MeV energy is:
- A)  $6.02 \times 10^{-13} \text{ kg}$   
B)  $1.766 \times 10^{-27} \text{ kg}$   
C)  $2.67 \times 10^{-27} \text{ kg}$   
D)  $6.02 \times 10^{-27} \text{ kg}$
- The energy equivalent of 1 kg of matter is about.
- A)  $10^{17} \text{ J}$   
B) 1 J  
C)  $10^{-17} \text{ J}$   
D)  $10^{17}$
- The radioactive nuclide  $^{228}_{88}\text{Ra}$  decays by a series of emissions of three alpha particles and one beta particle. The nuclide X finally formed is,
- A)  $^{220}_{88}\text{X}$   
B)  $^{216}_{84}\text{X}$

- C)  $^{220}_{86}\text{X}$   
D)  $^{216}_{86}\text{X}$
- A radioactive substance has a half life of four months. 3-fourth of the substance will decay in.
- A) 6 months  
B) 8 months  
C) 12 months  
D) 16 months
- Gamma radiations are emitted due to:
- A) De-excitation of atom  
B) De-excitation of nucleus  
C) Excitation of atom  
D) Excitation of nucleus
- Unit of decay constant  $\lambda$  is.
- A)  $\text{ms}^{-1}$   
B)  $\text{m}^{-1}$   
C)  $\text{m}$   
D) none
- Which of the following basic force is able to provide an attraction between two neutrons:
- A) Electrostatic and nuclear  
B) Electrostatics and gravitational  
C) Gravitational and strong nuclear  
D) Only nuclear force
- Bottom quark carries charge:
- A)  $\frac{2}{3} e$   
B)  $-\frac{2}{3} e$   
C)  $+\frac{1}{3} e$   
D)  $-\frac{1}{3} e$

## Keys and Solution

Answer: B) Nucleus B

Solution: As  $B.E = \Delta m C^2$ 

So the nucleus of greater mass has greater binding energy.

Answer: C) 36

Solution: As  $^{66}_{30}\text{Zn}$  number of neutrons are  $N = A - Z$   
 $= 66 - 30 = 36$ Answer: B)  $1.766 \times 10^{-27} \text{ kg}$ Solution:  $E = mc^2$  $931 \times 10^6 \times 1.6 \times 10^{-19} = m (3 \times 10^8)^2$  $m = \frac{931 \times 10^6 \times 1.6 \times 10^{-19}}{(3 \times 10^8)^2}$  $= 1.766 \times 10^{-27} \text{ Kg}$ Answer: D)  $10^{17} \text{ J}$ Solution:  $E = mc^2$  $= (1 \text{ kg}) (3 \times 10^8)^2$  $= 9 \times 10^{16} \text{ J}$  $= 10^{17} \text{ J}$ Answer: C)  $^{216}_{83}\text{X}$ Solution:  $^{228}_{86}\text{Ra} \xrightarrow{\alpha} ^{216}_{82}\text{Y} \xrightarrow{\beta} ^{216}_{83}\text{X}$ 

Answer: B) 8 months

Solution: Fraction of undamaged nuclei

$$= 1 - \left(\frac{1}{2}\right)^n$$

$$\frac{1}{4} = 1 - \left(\frac{1}{2}\right)^n$$

$$\left(\frac{1}{2}\right)^n = \frac{1}{4}$$

$$\left(\frac{1}{2}\right)^n = \left(\frac{1}{2}\right)^2$$

So  $n=2$  As time for one half life is four month. So the time for two half lives is eight months.

7. Answer: B) De-excitation of nucleus

Solution: Nucleus can also de-excite as an atom. Which results in emission of energy ( $\gamma$ -ray)8. Answer: D)  $\text{s}^{-1}$ 

Solution:  $\lambda = \frac{\Delta N/N}{\Delta t}$

As  $\frac{\Delta N}{N}$  has no unit of  $\text{s}^{-1}$ 9. Answer: C) Gravitational and strong nuclear  
Solution: Gravitational and strong nuclear forces are both attractive.10. Answer: D)  $-\frac{1}{3} e$ Solution: Charge on bottom quark is  $-\frac{1}{3} e$



PHYSICS

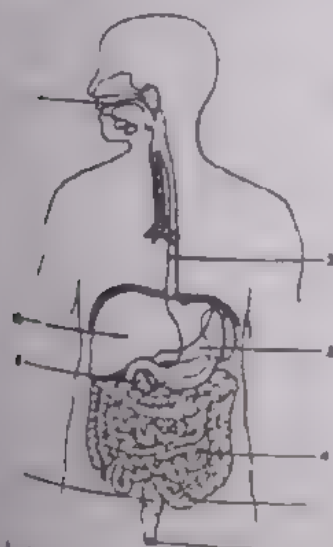
1. The time period of a pendulum is measured to be 3.0 seconds in the inertial reference frame of the pendulum. What is its period measured by an observer moving at a speed of  $0.95c$  with respect to the pendulum?  
 A) 1.2 s                                      B) 3.4 s  
 C) 8.1 s                                      D) 9.6 s  
 E) 9.0 s
2. What is the mass "m" of a moving object with speed  $0.8c$ .  
 A) 1.67 mo                                      B) 3.67 mo  
 C) 4.67 mo                                      D) 6.67 mo  
 E) 7.67 mo
3. The emission of electrons from a metal surface when exposed to light of suitable frequency is known as.  
 A) Compton's effect                                      B) Photoelectric effect  
 C) Coulomb's law                                      D) Faraday's law  
 E) Ohm's law
4. The special theory of relativity is based upon: (I) The laws of physics are the same in all inertial frames. (II) The speed of light in free space has the same value for all observers regardless of their state of motion.  
 A) I only                                      B) II only  
 C) I and II                                      D) None of the above
5. What is the energy of a photon in a beam of infrared radiation of wavelength 1240 nm?  
 A) 1.0 eV                                      B) 3.0 eV  
 C) 5.0 eV                                      D) 7.0 eV  
 E) 9.0 eV
6. A nucleus consists of nucleons comprising of protons and neutrons. A proton has a positive charge equal to \_\_\_\_\_ and has a mass \_\_\_\_\_.  
 A)  $2.6 \times 10^{-19}C$  ...  $36 \times 10^{-28} \text{ kg}$   
 B)  $1.6 \times 10^{-19}C$  ...  $1.673 \times 10^{-27} \text{ kg}$   
 C)  $3.6 \times 10^{-19}C$  ...  $2.111 \times 10^{-27} \text{ kg}$   
 D)  $4.6 \times 10^{-19}C$  ...  $9.111 \times 10^{-27} \text{ kg}$   
 E)  $5.6 \times 10^{-19}C$  ...  $8.111 \times 10^{-27} \text{ kg}$
7. Identify the isotope/s of Helium.  
 A)  $32\text{He}$                                       B)  $1\text{He}$   
 C)  $1; \text{He}$                                       D)  $3\text{He}$   
 E) Both A and B
8. The half-life  $T_{1/2}$  of radioactive elements is that period in which of 2 the atoms decay.  
 A) Nine times                                      B) Double  
 C) Half                                      D) Four times  
 E) Seven times
9. Fluorescence is the property of absorbing radiant energy of frequency and re-emitting energy of frequency in the visible region of electromagnetic spectrum.  
 A) low high                                      B) high low  
 C) low low                                      D) high high
10. A reaction in which a heavy nucleus like that of uranium splits up into two nuclei of roughly equal size along with the emission of energy during the reaction is called  
 A) Fission reaction                                      B) Fusion reaction  
 C) Counter reaction                                      D) Chemical reaction
11. Identify the main type of nuclear reactors:  
 A) Slow reactors                                      B) Fast reactors  
 C) Thermal reactors                                      D) Both A and B
12. What is the average translational kinetic energy of molecules in a gas at temperature  $27^\circ\text{C}$ ?  
 A)  $3.23 \times 10^{-21}\text{J}$                                       B)  $4.11 \times 10^{-21}\text{J}$   
 C)  $6.21 \times 10^{-21}\text{J}$                                       D)  $7.71 \times 10^{-21}\text{J}$   
 E)  $9.11 \times 10^{-21}\text{J}$
13. Numbers are expressed in standard form called scientific notation, which employs powers of:  
 A) 2                                      B) 8  
 C) 10                                      D) 16
14. A 1500 kg vehicle has its velocity reduced from 20 m/s to 15 m/s in 3.0 seconds. how large was the average retarding force?  
 (A) -0.5 N                                      B) -1.5 N  
 C) -2.0 N                                      D) -2.5 N  
 E) -3.5 N
15. An object moving through a fluid experiences a retarding force known as drag \_\_\_\_\_ force. The drag force as the speed of the object  
 A) decreases .. decreases  
 B) decreases .. increases  
 C) increases .. decreases  
 D) increases .. increases
16. The property of bending of light around obstacles and spreading of light waves into geometrical shadow of an obstacle is known as:  
 A) Diffraction                                      B) Interference  
 C) Polarization                                      D) Optical Rotation
17. The distance between the slits in Young's double slit experiment is 0.25cm. Interference fringes are formed on a screen placed at a distance of 100cm from the slits. The distance of the third dark fringe from the central bright fringe is 0.059cm. what is the wavelength of the incident light?



1.  $\text{I}^-$ ,  $\text{Cl}^-$  B)  $\text{H}^+$ ,  $\text{IO}_3^-$ , tosylate  
 2. If 2-amino-3-methylbutane were treated with excess methyl iodide, silver oxide, and water, what would be the major reaction products?  
 A) Trimethylamine and 3-methyl-1-butene  
 B) Ammonia and 2-methyl-2-butene  
 C) Trimethylamine and 2-methyl-2-butene  
 D) Ammonia and 3-methyl-1-butene  
 3. If an amino acid ( $\text{pI} = 9.74$ ) in acidic solution is completely titrated with sodium hydroxide, what will be its charge at  $\text{pH}$  3, 7, and 11 respectively?  
 A) Positive, neutral, negative  
 B) Negative, neutral, positive  
 C) Neutral, positive, positive  
 D) Positive, positive, negative  
 4. Amino acids with nonpolar R-groups have which of the following characteristics in aqueous solution?  
 A) They are hydrophilic and found buried within proteins  
 B) They are hydrophobic and found buried within proteins  
 C) They are hydrophobic and found on proteins surfaces  
 D) They are hydrophilic and found on protein surface

## BIOLOGY

1. At which side does digestion of starches begin?



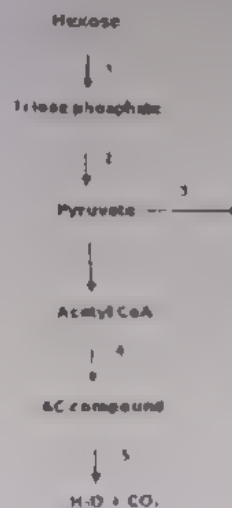
B) 2 C) 3 D) 4 E) 5

Structure 10:

- A) Produces bile B) Stores bile  
 C) Secretes bicarbonate D) Secretes lipase  
 E) Secretes HCl

Which structure is primarily responsible for water absorption during digestion?

4. The diagram summarizes the pathway of glucose break down:



Which two steps result in a net increase of ATP?

- A) 1 and 3 B) 1 and 4  
 C) 2 and 4 D) 2 and 5  
 E) 3 and 5  
 5. Which one of the following enables the mammalian kidney to regulate water reabsorption during states of dehydration?  
 A) The cells of the tubules detect the osmotic pressure of the blood.  
 B) Water is extracted from the glomerular filtrate in the proximal tubule.  
 C) The kidney produces hypotonic urine  
 D) Hormones increases the permeability of the collecting ducts.  
 E) A low solute concentration is maintained around the collecting ducts  
 6. A drug reduces mitochondrial activity in nephrons of kidney. Which chemical will be present in increased amount in the urine?  
 A) Ammonia B) Glucose  
 C) Hydrogen bicarbonate D) Urea  
 7. Where, in the nephron, is most glucose reabsorbed?  
 A) In the ascending loop of Henle  
 B) In the descending loop of Henle  
 C) In the proximal (first) convoluted tubule  
 D) In the distal (second) convoluted tubule  
 8. Consider the following statements about biological communities.  
 (I) their members share a common gene pool.  
 (II) The community remains stable even though some physical aspect of the environment may undergo change.

- C)  $\text{CH}_3\text{COCH}_3$  D)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
15. Arrange the following compounds in order of increasing reactivity towards the addition of  $\text{HCN}$ . Acetone (I), acetaldehyde (II), methyl t-butyl ketone (III), di-t-butyl ketone (IV)
- A)  $\text{IV} < \text{I} < \text{II} < \text{III}$  B)  $\text{I} < \text{II} < \text{III} < \text{IV}$   
 C)  $\text{IV} < \text{III} < \text{I} < \text{II}$  D)  $\text{II} < \text{I} < \text{III} < \text{IV}$
16. The reaction  $\text{CH}_3\text{COOAg} + \text{Br}_2 \rightarrow 3\text{CH}_3\text{Br} + \text{CO}_2 + \text{AgBr}$  is known as:
- A) Reformatsky reaction  
 B) Hunsdiecker reaction  
 C) Decarboxylation  
 D) Hell-Volhard-Zelinsky reaction
17.  $\gamma$ -Butyrolactone (ester) does not react with:
- A)  $\text{NH}_3$  B)  $\text{LiAlH}_4$   
 C)  $\text{FeOH}$  D)  $\text{NaBH}_4 / \text{FeOH}$
18. Electric cookers have coating of that protects them against fire.
- A) Heavy lead B) Magnesium oxide  
 C) Zinc oxide D) Sodium sulphate
19. Macromolecules are of types.
- A) Three B) Four  
 C) Five D) Six  
 E) Seven
20. The long chains of Amino Acids are called
- A) Oils B) Polypeptides  
 C) Monopeptides D) Proteins
21. The general formula for Carbohydrates is:
- A)  $\text{N}_n(\text{H}_2\text{O})_n$  B)  $\text{Pn}(\text{H}_2\text{O})_n$   
 C)  $\text{C}_n(\text{H}_2\text{O})_n$  D)  $\text{H}_n(\text{H}_2\text{O})_n$   
 E)  $\text{H}_n\text{C}_n(\text{O})_n$
22. Lipids are generally defined in terms of:
- A) Solubility B) Structure  
 C) Molanty D) All of the above
23. As a result of increased  $\text{CO}_2$  in the atmosphere, oceans will become more
- A) Alkaline B) Acidic  
 C) Saline D) Cooler
24. Infrared lamps are used in restaurants and cafeterias to keep food warm. The Infrared radiation is strongly absorbed by water, raising its temperature and that of the food. If the wavelength of infrared radiation is assumed to be 1500nm, then the number of photons per second of infrared radiation produced by an infrared lamp that consumes energy of the rate of 100 watt and is 12% efficient will be:
- A)  $4 \times 10^{16}$  B)  $9 \times 10^{16}$   
 C)  $11 \times 10^{17}$  D)  $15 \times 10^{17}$
25. When  $\text{N}_1$  is formed from  $\text{N}_2$ , bond order when  $\text{O}_2$  is formed from  $\text{O}_2$ , bond order
- A) Increases, increases B) decreases, decreases  
 C) increases, decreases D) decreases, increases
26. The process requiring absorption of energy
- A)  $\text{F} \rightarrow \text{F}^+$  B)  $\text{Cl} \rightarrow \text{Cl}^-$   
 C)  $\text{O} \rightarrow \text{O}^{2-}$  D)  $\text{H} \rightarrow \text{H}^+$
27. A solution of 500ml of 0.2M  $\text{KOH}$  and 500ml of 0.2M  $\text{HCl}$  is mixed and stirred, the final temperature is  $T_1$ . The experiment is repeated using 250ml of each of the solution, the temperature rise is  $T_2$ . Which of the following is true?
- A)  $T_1 = T_2$  B)  $T_1 = 2T_2$   
 C)  $T_1 = 4T_2$  D)  $T_1 = 9T_2$
28. An aqueous solution of  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  appears
- A) Greenish yellow in colour  
 B) Blue in colour  
 C) Violet in colour D) Yellow in colour
29. Amongst the following ions, which has the highest Para magnetism?
- A)  $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$  B)  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$   
 C)  $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$  D)  $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$
30.  $\text{Zn}_{(s)} + \text{Cu}^{2+}_{(aq)} \rightarrow \text{Cu}_{(s)} + \text{Zn}^{2+}_{(aq)}$ . At 300 K,  $E_{\text{cell}} = 1.10\text{V}$ , and at 1.12 V. What is the entropy change ( $\Delta S$ ) for the above cell reaction?
- A)  $386\text{J K}^{-1}$  B)  $486\text{J K}^{-1}$   
 C)  $286\text{J K}^{-1}$  D)  $586\text{J K}^{-1}$
31. For a gaseous reaction,  $\text{A}_2 + 2\text{B} \rightarrow 2\text{AB}$  the following rate data obtained at 250K.
- | Rate of disappearance of $\text{A}_2$ $-\frac{d[\text{A}_2]}{dt} (\text{mole l}^{-1} \text{s}^{-1})$ | Concentration of $[\text{A}_2]$ (mole $\text{l}^{-1}$ ) | Concentration of $[\text{B}]$ (mole $\text{l}^{-1}$ ) |
|--|---|---|
| $1.2 \times 10^{-5}$   | 0.10  | 0.01  |
| $4.8 \times 10^{-5}$   | 0.10  | 0.04  |
| $2.4 \times 10^{-5}$   | 0.20  | 0.01  |
- Calculate the rate of formation of AB when  $[\text{A}_2] = 0.02\text{M}$  and  $[\text{B}] = 0.01\text{M}$  at 250K.
- A)  $4.8 \times 10^{-5} \text{ mole l}^{-1} \text{s}^{-1}$   
 B)  $4.8 \times 10^{-6} \text{ mole l}^{-1} \text{s}^{-1}$   
 C)  $5.8 \times 10^{-4} \text{ mole l}^{-1} \text{s}^{-1}$   
 D)  $5.8 \times 10^{-3} \text{ mole l}^{-1} \text{s}^{-1}$
32. Which of the following conditions, leaving group and nucleophile, respectively would most favor an  $\text{S}_\text{N}2$  reaction?

(III) They pass predictable kinds of species of predictable proportions.

(IV) Interactions between their members are more frequent within the community than between their members and those of neighboring communities. Which two of the above statements apply to all stable biological communities?

- A) I and II  
B) II and III  
C) I and III  
D) III and IV  
E) II and IV

9. The spinal cord serves as the center of:

- A) Sub conscious thought  
B) Reflex actions  
C) Habits  
D) Tropisms

10. The most abundant substance in protoplasm is:

- A) Protein  
B) Fat  
C) Carbohydrates  
D) Water  
E) Minerals

11. The placenta releases all of the following hormones EXCEPT:

- A) Progesterone  
B) LH  
C) HCG  
D) Estrogen

12. The diagram below represents the synapse between two mammalian myelinated neurons, X and Y.



The arrows show the direction of impulses. The transmission of impulses across the synapse is brought about by the:

- A) Break-down of the terminal membrane of X.  
B) Passage of an electric current between X and Y.  
C) Release of sodium ions from X.  
D) Build-up of a potential difference between X and Y.  
E) Secretion of a chemical from X.

13. All of the following organs produce hormones involved in the reproductive cycle except the:

- A) Testes  
B) Pituitary  
C) Pancreas  
D) Ovary  
E) Uterus

14. In human female FSH regulates the concentration of:

- A) Cortisol  
B) Estrogen  
C) Aldosterone  
D) None of the above

15. The Reduction-division occurs during the process of:

- A) Cleavage  
B) Differentiation  
C) Fertilization  
D) Meiosis  
E) Parthenogenesis

16. The muscles attached to the bones are:

- A) Voluntary and smooth  
B) Involuntary and smooth  
C) Voluntary and striated  
D) Involuntary and striated  
E) Smooth and striated

17. Which of the following statements regarding the periosteum is INCORRECT?

- A) The periosteum serves as the site of attachment of bone to muscle  
B) Cells of the periosteum differentiate into osteoblasts  
C) The periosteum is a fibrous sheath that surrounds long bones  
D) None of the above

18. The absorption and use of calcium are regulated by:

- A) Parathormone  
B) Adrenaline  
C) Prolactin  
D) Thiamin  
E) Progesterone

19. The most correct statement about muscle contraction is:

- A) Actin moves to shorten the muscle  
B) Crossbridge connecting the two molecule of a myofibril is made up of G-Actin  
C) On traction of myosin molecule results in muscle contraction  
D) K is necessary for binding of cross bridges

20. On a very cold day, a man waits for over an hour at the bus stop. Which of following structure helps his body set and maintains a normal body temperature?

- A) Hypothalamus  
B) Kidneys  
C) Heart  
D) Brain stem

21. Energy can be made available to the body in the following ways:

(I) Conversion of surplus amino acids and glycerol to blood glucose and mobilization of fat deposits which pass to the tissues for oxidation.

(II) Breakdown of liver and muscle glycogen to form glucose.

(III) Breakdown of tissue proteins to release amino acids which are then converted into glucose. In which order does the body draw on potential energy when it is being starved, food?

- A) I—II—III  
B) I—III—II  
C) II—I—III  
D) II—III—I  
E) III—I—II

22. The nucleus contains all of the following structures except:

- A) Mitochondria  
B) Chromatin  
C) Genes  
D) Nucleolus  
E) Nuclear membrane



2. Which of the following choices INCORRECTLY pairs of digestive enzyme with site of secretion?

- A) Pancreatic amylase pancreas
- B) Aminopeptidase Stomach
- C) Interoxinase .. intestinal glands
- D) Maltase .. intestinal glands

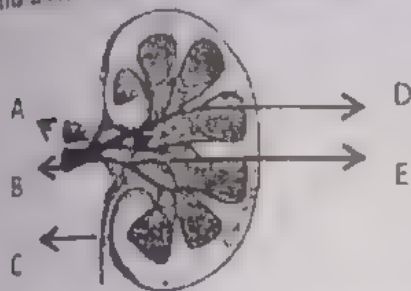
3. The division of biology that deals with classification is:

- A) Zoology
- B) Histology
- C) Botany
- D) Morphology
- E) Taxonomy

4. All of the following are organelles except the:

- A) Endoplasmic reticulum
- B) Mitochondria
- C) Ribosome
- D) Golgi complex
- E) Ultracentrifuge

5. The diagram shows a section through a kidney and associated blood vessels



In which area is there the greatest movement of fluid from the blood through the wall of blood vessels?

- A) A
- B) B
- C) C
- D) D
- E) E

6. Which function is not carried out by the mammalian kidney?

- A) Removal of bile pigments from the body
- B) Removal of excess mineral salts from the body
- C) Maintenance of a constant osmotic pressure of the blood
- D) Maintenance of a constant pH of the blood

7. According to the Hardy-Weinberg principle, the gene pool may remain stable if there are:

- A) Random matings
- B) Many mutations
- C) Frequent migrations
- D) Selected matings
- E) Random mutations

8. Genes P, Q, R and S occur on the same chromosome. Investigation of a large population

NUMS and National MDCAT by Ali Sudais

produced the following cross-over values between pairs of genes.

P and R 34%

P and Q 59%

R and S 12%

S and Q 37%

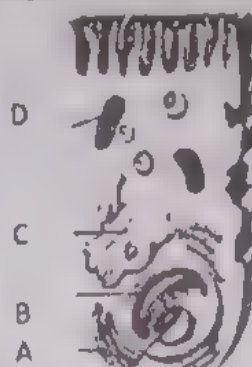
Which of the following sequence represents the sequence of genes on the chromosome?

- A) PRSQ
- B) PSRQ
- C) QSPR
- D) RQSP
- E) SPRQ

30. Which of the following kinds of atom do not occur in carbohydrates?

- A) Carbon
- B) Hydrogen
- C) Nitrogen
- D) Oxygen

31. The diagram is taken from an electron micrograph of a cell, name the organelle labeled D:



- A) Nucleus
- B) Lysosome
- C) Golgi complex
- D) Mitochondrion
- E) Endoplasmic reticulum

32. Of the following organic compounds, the one that represents a protein is:

- A)  $C_2H_5O_2$
- B)  $C_7H_{12}O_6$
- C)  $C_7H_5COOH$
- D)  $(C_6H_{10}O_5)_n$
- E)  $C_{68}H_{114}O_{24}N_{16}S_4$

33. In which of the following organic compounds is a  $COOH$  (carboxyl) group found?

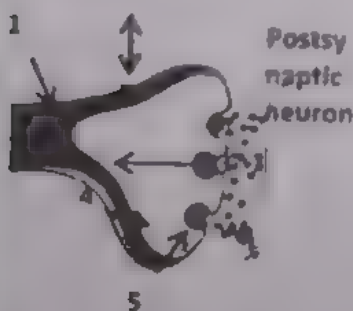
- (I) Carbohydrate
- (II) Lipid
- (III) Protein
- A) I only
- B) II only
- C) I and III only
- D) II and III only
- E) I, II and III



Time Allowed: 150 Minutes Total MCQs: 100

## BIOLOGY

- A student is trying to determine the type of membrane transport occurring in a cell. She finds that the molecule to be transported is very large and when transported across the membrane, No ATP is used. Which of the following is the most mechanism of transport?
  - Active transport
  - Simple diffusion
  - Facilitated diffusion
  - Exocytosis
- In the course of glycolysis:
  - NADH is reduced to NAD<sup>+</sup>
  - NAD<sup>+</sup> is oxidized to NADH
  - Glucose is degraded into two molecules
  - Both A and B
- The epiglottis is to trachea as the lower esophagus (cardiac) sphincter is to the:
  - Stomach
  - Heart
  - Small intestine
  - Liver
- Starch is hydrolyzed into maltose by:
  - Salivary amylase
  - Maltose
  - Pancreatic amylase
  - Both A and C
- Which of the following best describes the residual volume of the lungs?
  - The amount of air normally inhaled and exhaled with each breath
  - The maximum amount of air that can be forcibly inhaled and exhaled from the lungs.
  - The volume of air that can still be forcibly exhaled following a normal exhalation.
  - The volume of air that always remains in the lungs.
- The diagram show the sequence of events occurring as an action potential arrives at a synapse. The numbered arrows represent movement of substances across the membranes?



## BIOLOGY

What are the substances moving across the membranes?

	1	2	3	4	5
A)	K <sup>+</sup>	Na <sup>+</sup>	Acetylcholine	Ca <sup>2+</sup>	K <sup>+</sup>
B)	K <sup>+</sup>	Na <sup>+</sup>	K <sup>+</sup>	Ca <sup>2+</sup>	Acetylcholine
C)	Na <sup>+</sup>	K <sup>+</sup>	Ca <sup>2+</sup>	Acetylcholine	Na <sup>+</sup>
D)	Na <sup>+</sup>	K <sup>+</sup>	Ca <sup>2+</sup>	Acetylcholine	Ca <sup>2+</sup>

- Arthropods can be characterized by all of the following except.
  - A hard exoskeleton
  - A water vascular system
  - Jointed appendages
  - Molting
  - Segmented body
- The role of decomposers in the nitrogen cycle is to:
  - Fix atmospheric nitrogen into ammonia.
  - Incorporate nitrogen into amino acids and organic compounds.
  - Convert ammonia to nitrate, which can be then absorbed by plants.
  - Denitrify ammonia, thus returning nitrogen to the atmosphere.
  - Release ammonia from organic compounds, thus returning into the soil.
- Black coat color in horses is caused by a dominant allele, while white coat color is due to the recessive allele. Two black horses produce a foal with white coat. If they will produce a second foal what would be the probability of the second foal having a black coat?
  - 0
  - 1/0
  - 1/2
  - 1/4
- Organisms that live in the intertidal zone might have which of the following characteristics? (i) Ability to conduct photosynthesis (ii) Tolerance of periodic drought (iii) Tolerance of wide range of temperatures
  - I only
  - II only
  - I and II only
  - I and III only
- In floral formula K stands for:

1. Corolla  
2. Petal  
3. Anther  
4. Ovary  
5. Style  
6. Stigma  
7. Sepal  
8. Pedicel  
9. Receptacle  
10. Flower  
11. Bud  
12. Pollen  
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- C) Pulmonary artery into the right ventricle  
D) Right ventricle into the right atrium
27. The liver:
- A) Decreases blood glucose levels  
C) All of the above are the functions of the liver  
D) Synthesizes glucose  
B) Increases blood glucose levels
28. At which two points of the menstrual cycle are the level estrogen height?
- A) Immediately before and after ovulation  
B) At ovulation and during the menstrual flow  
C) During the menstrual flow and pregnancy  
D) Pregnancy and after menopause
29. Herpes is a virus that enters the human body and remains dormant in the nervous system until it produces an outbreak, without any particular reason. Which of the following statements correctly describes herpes?
- A) While it remains dormant in the nervous system, the virus is in its lysogenic cycle.  
B) During an outbreak, the virus is in the lytic cycle.  
C) Herpes integrates itself into the DNA of the cell  
D) All of the above
30. Which of the following statements could not be used to describe a species?
- A) A group of organisms showing distinctly similar autosomes  
B) A group of organisms showing analogous body structure.  
C) A group of organisms capable of mating to produce viable off spring  
D) A group of organisms sharing the same ecological niche.  
E) A group of organisms sharing unique structural and functional characteristics.

### PHYSICS

- A frictionless heat engine can be 100% efficient only their exhaust temperature is:
- A) Double of its input temperature  
B) Half of its input temperature  
C) Equal of its input temperature  
D) 100%  
E) 0 K°
- The vector which only specifies the direction of a given vector is called:
- A) Free vector  
B) Position vector  
C) Null vector  
D) Unit vector
- A ball is thrown vertically upward with velocity of 196m/s. How high does the ball rise?
- A) 1960 meters  
B) 2960 meters  
C) 1000 meters  
D) 1100 meters
4. If there is no external force applied to a system, then the total momentum of that system remains constant. This is known as:
- A) Law of conservation of mass  
B) Elastic collision  
C) Law of conservation of momentum  
D) Momentum of body
5. A car travelling at a constant speed of 90 km/h rounds a curve of a radius 100m. What is its acceleration?
- A) 4.0 m/sec<sup>2</sup>  
B) 6.25 m/sec<sup>2</sup>  
C) 6.5 m/sec<sup>2</sup>  
D) 4.5 m/sec<sup>2</sup>  
E) 7.5 m/sec<sup>2</sup>
6. A body on a 20m high cliff drops a stone. One second later, he throws down another stone. Both the stones hit the ground simultaneously. Find the initial velocity of the second stone,  $g = 10 \text{ m/sec}^2$
- A) 5m/sec<sup>2</sup>  
B) 10m/sec<sup>2</sup>  
C) 15m/sec<sup>2</sup>  
D) 20m/sec<sup>2</sup>  
E) 30m/sec<sup>2</sup>
7. An elevator, in which a man is standing moving upward with a constant speed of 10m/sec. If a man drops a coin from a height of 2.5m. Find the time taken by it to reach the floor of the elevator  $g = 9.8 \text{ m/sec}^2$ .
- A) 0.707 sec  
B) 1.9 sec  
C) 3.1 sec  
D) 6.17 sec  
E) 7.
8. A 100 KG man runs up a hill through a height of 4m in seconds. How much work does he do against gravitational force?
- A) 2060 J  
B) 3920 J  
C) 5000 J  
D) 5290
9. Which statement describes the electrical potential difference between two points in a wire carrying a current?
- A) The force required to move a unit positive charge between the points  
B) The ratio of the energy dissipated between the points to the current  
C) The ratio of the power dissipated between the points to the current  
D) The ratio of the power dissipated between the points to the charge moved.  
E) None of the above
10. Find the time period of a simple pendulum whose length is 88.2cm. The value acceleration due to gravity is 9.8m/sec<sup>2</sup> at the place where experiment is performed?
- A) 1.885 sec  
B) 1.233 sec  
C) 2.05 sec  
D) 4 sec
11. A light bulb has resistance of 1500. Find the voltage while the current is 1.5 A.



12. An object that is moving with constant speed travels around a circular path. Which of the following is / are true concerning this motion?
- The displacement is zero  
The average speed is zero  
The acceleration is zero
- A) I only  
B) I and III only  
C) II and III only  
D) III only
13. A system absorbs 803 through heating while doing 1003 of experimental work. What is the change in the internal energy of the system?
- A) -100J  
B) -20J  
C) +80J  
D) +180J
14. A region round a charge body in which another charge experiences an electric force is called:
- A) Electric flux  
B) Electric field  
C) Electric potential  
D) Capacitance
15. A convex lens of focal length 40cm is in contact with a concave lens of focal length 25cm. The power of the combination in diopters is:
- A) -5.0  
B) -6.5  
C) +6.5  
D) +6.67  
E) -7.7
16. A simple pendulum suspended from the ceiling of a train has a period "T" when the train is at rest. When the train is accelerating with a uniform acceleration, the time period of simple pendulum will:
- A) Decrease  
B) Increase  
C) Remain unchanged  
D) Become infinite  
E) Insufficient information
17. Lenz's law states that:
- A) The flow of a fluid in a medium under same applied force experiences some sort of friction or resistance in its path.  
B) A body remains at rest or continuous to move with uniform velocity unless acted upon by an unbalanced force  
C) The induced current always flows in such a direction as to oppose the change which giving rise to it.  
D) When a particle bearing a charge  $q$  and moving with a velocity  $V$  enters the region of a uniform magnetic field of induction  $B$ , it is acted upon by a force
18. Two rail cargo cars are being hit together. The first car has a mass 15750 KG and is moving at a speed of 4m/sec. Calculate the final velocity of the two cars.
- A) 8 m/sec  
B) 3.8 m/sec  
C) 5 m/sec  
D) 7.8 m/sec

19. Two capacitors  $C = 2\mu F$  are connected in series across a 100V supply. Find the effective capacitance.
- A)  $\frac{1}{2}\mu F$   
B)  $\frac{1}{4}\mu F$   
C)  $\frac{1}{3}\mu F$   
D)  $\frac{1}{5}\mu F$   
E)  $\frac{1}{6}\mu F$
20. Consider two equal resistors wired in parallel. What is the equivalent resistance of the two?  $3R$
- A)  $\frac{2R}{3}$   
B)  $\frac{R}{2}$   
C)  $\frac{R}{3}$   
D)  $\frac{R}{5}$   
E)  $\frac{R}{7}$
21. A detector with a surface area of 1 square meter is placed in from an operating jackhammer. It measures the power of jackhammer sounds as being 10-3W. Find the intensity of the jackhammer.
- A) 10w/m<sup>2</sup>  
B) 10<sup>-3</sup> W/m<sup>2</sup>  
C) 10<sup>-9</sup> w/m<sup>2</sup>  
D) 10<sup>-7</sup> w/m<sup>2</sup>  
E) 10<sup>-11</sup>W/m<sup>2</sup>
22. Ultra violet light is more likely to cause a photoelectric effect than a visible light. This is because photons of ultraviolet light.
- A) Have a longer wavelength  
B) Have higher velocity  
C) Are not visible  
D) Have a higher energy
23. If an object is released 19.6 meter above the ground. How long does it take the object to reach the ground? ( $g = 9.8 \text{ m/sec}^2$ )
- A) 1 second  
B) 2 seconds  
C) 3 seconds  
D) 8 seconds  
E) 10 seconds
24. Two tuning forks are sounded, one has a frequency of 250 Hz while the other has a frequency of 245 Hz. What is the frequency of the beats?
- A) 250 Hz  
B) 245 Hz  
C) 5 Hz  
D) 10 Hz  
E) 235 Hz
25. A rock is dropped from a high bridge at the end of 3 seconds of free fall the speed of the rock in cm/s.
- A) 30  
B) 100  
C) 5.00  
D) 1000  
E) 2940
26. A body rolling freely on the surface of the earth eventually comes to rest because:
- A) It has mass  
B) It suffers friction



- C) It has inertia of rest  
D) It has a momentum  
E) Its gravitation is less because it is already on the surface
7. A 100 Kg car can accelerate from rest to speed of 25 m/sec in 10s. What average power (in kilo watts) must the engine of the car produce in order to cause this acceleration? Neglect the friction loss.  
A) 33.25                      B) 36.25  
C) 48.44                      D) 3125  
E) 4125
8. The kinetic energy of a projectile at the highest point is half of its kinetic energy. The angle of projection is:  
A) 0°                          B) 30°C  
C) 60°C                      D) 45°C  
E) 90°
9. A small and a large rain drops are falling through air:  
A) The small drop will evaporate  
B) The large drop moves faster  
C) The small drop moves faster  
D) Both move with the same speed  
E) No conclusion can be drawn unless the exact sizes of the drops are known
10. A container is divided into two equal portions. One portion contains an ideal gas at pressure P and temperature T while the other portion is a perfect vacuum. If a hole is opened between the two portions.  
A) There will be a change in internal energy.  
B) There will be a change in temperature.  
C) There will be no change in internal energy.  
D) The external pressure will increase.  
E) The external pressure will decrease.

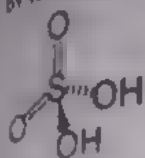
### CHEMISTRY

- Which gaseous hydride most readily decomposes into its elements on contact with a hot glass rod?  
A) Ammonia                      C) Hydrogen iodide  
B) Hydrogen chloride              D) Steam
- A hydrocarbon, which is a liquid at a room temperature and decolorizes aqueous bromine. What could be the molecular formula of the compound?  
A) C<sub>2</sub>H<sub>4</sub>                          B) C<sub>2</sub>H<sub>6</sub>  
C) C<sub>2</sub>H<sub>2</sub>                          D) C<sub>2</sub>H<sub>2</sub>O
- Bleaching powder is a good:  
A) Hydrating agent              B) Oxidizing agent  
C) Dehydrating agent              D) Reducing agent
- The value of the enthalpy change for the process represented by the equation,  $\text{Na(s)} \rightarrow \text{Na}^+(\text{g}) + \text{e}^-$  is equal to:

- A) The first ionization energy of sodium  
B) The enthalpy changes of vaporization of sodium  
C) The sum of the enthalpy changes of the atomization and the first ionization energy of sodium  
D) The sum of the enthalpy changes of atomization and the electron affinity of sodium
5. Which statement is wrong about one mole of metal.  
A) It contains the same number of atoms as 1 mole of hydrogen atoms.  
B) It contains the same number of atoms as 1.2 mole of C12  
C) 1 mole of contains NA carbon atoms.  
D) Mass of one mole of Na is 23 g.
6. As the atomic number increases in group, the chemical properties:  
A) Change                      B) Stay roughly the same  
C) Decreases                      D) Increases
7. The crystals formed as a result of vander Waals interactions are:  
A) Molecular crystals              B) Covalent crystals  
C) Metallic crystals              D) Ionic crystals
8. All the following are the true statement concerning catalyst except.  
A) A catalyst will speed up the rate determining step  
B) A catalyst will be used up in a reaction.  
C) A catalyst may induce steric strain in a molecule to make it react more readily.  
D) A catalyst will lower the activation energy of reaction
9. Which of the following process is endothermic?  
A) The condensation  
B) The electrolysis of water  
C) The freezing of the water  
D)  $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{CaO(a)} + \text{H}_2$   
E)  $\text{W(ag)} + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}$
10. Which reagent gives a colorless homogeneous solution when added to phenol?  
A) Aqueous sodium hydroxide and benzoyl chloride  
B) Aqueous sodium carbonate  
C) Aqueous sodium hydroxide  
D) Aqueous bromine
11. Which substance has tetrahedral geometry?  
A) Benzene                      B) Methane  
C) Cyclohexane                      D) None of the above
12. The free radical takes part in the destruction of the ozone layer.  
A) Chlorine                      B) Helium  
C) Neon                          D) Xenon
13. How many atoms of carbon are present in 17g of glucose C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>?  
A)  $6.0 \times 10^{22}$                       B)  $3.4 \times 10^{23}$   
C)  $6.0 \times 10^{23}$                       D)  $3.6 \times 10^{23}$

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- which property of a gas effects the rate at which it spreads throughout a laboratory?
- Reactivity
- the bonding in Sulphuric Acid can be represented by the structure shown.



what is the total number of electrons in the covalent bonds surrounding the Sulphur atom?

- B) 6  
D) 12

One mole of an organic compound is completely burnt produces exactly three moles of water.

- ethane ( $C_2H_6$ )  
ethanol ( $C_2H_5OH$ )  
butane ( $C_4H_{10}$ )  
butanol ( $C_4H_9OH$ )  
propane ( $C_3H_8$ )  
propanol ( $C_3H_7OH$ )

Which is simplest amino acid?

- Valine  
Alanine  
Glycine  
Serine  
B) Lysine  
D) Aspartic Acid

Which substance must be an alkane?

- A) it burns in air or in oxygen.  
B) it contains carbon and hydrogen only.  
C) it has the general formula  $C_nH_{2n+2}$   
D) it is generally un-reactive.

Which statement shows that diamond and graphite are allotropes of carbon?

- A) Both have giant molecular structures  
B) Complete combustion of equal masses of carbon dioxide as the only product  
C) Graphite conducts electricity, whereas diamond does not  
D) Under suitable conditions, graphite can be converted into diamond.

1. Aufbau rule is not followed in filling to the subshell, then the block of which will change in the periodic table.

- B) Sc(21)  
D) Ni(28)

Which gas shows real behavior? In oxygen. Which compound

102 at S.T.P occupies a volume of 5.6 liters.  
102 in 0.5-liter flask exerts pressure of 24.6?

1 mole of  $NH_3$  at 3K and 1 atm occupies volume

1 mole of  $CO_2$  at STP is equal to 11 g.  
Heat of neutralization of strong acid by strong base

1. formed does not Hydrolyze  
2.  $H^+$  and  $OH^-$  ions react in every case.

1. strong acid strong base reacts completely.

## NMMS and National MDCAT by Ali Sudais

D) Strong base and strong acid react in aqueous solution

23. Compared with alkaline earth metals the alkali metals exhibit:

- A) Small atomic radii  
C) High boiling point  
D) Lower ionization energy  
B) Greater hardness

24. The number and types of bonds between two carbon atoms in  $C_2$  are:

- A) One sigma and one Pi bonds.  
B) One sigma and two Pi bonds.  
C) Two sigma and two Pi bonds.  
D) One sigma bond.

25. The alloy of copper and tin is called:

- A) Brass  
C) German silver  
B) Bronze  
D) Metal

26. Which of the following is not an electrophile?

- A)  $NH_3$   
C)  $AlCl_3$   
B)  $BF_3$   
D)  $SO_2$

27. How many isomers are possible for the compound having molecular formula  $C_4H_9Br$ .

- A) 5  
C) 6  
B) 4  
D) 8

28. Which xylene is most easily sulphonated.

- A) Ortho  
C) Meta  
B) Para  
D) All at the same rate

29. Which one of the following is likely to give a precipitate with  $AgNO_3$  solution?

- A)  $NaCl$   
C)  $CH_2=CHCl$   
B)  $CH_3Cl$   
D)  $(CH_3)_3CCl$

30. In  $sp^3d$  hybridization, the "d" orbital that participates in hybridization is:

- A)  $dx^2-y^2$   
C)  $dxy$   
B)  $dz^2$   
D)  $dxz$

### ENGLISH

1. Which is not a past form of verb?

- A) Was  
C) Had  
E) Hear  
B) Looked  
D) Spoke

2. Which contains an adjective?

- A) Old man  
C) She said  
E) Afternoon  
B) On Tuesday  
D) And you

3. Which contains an adverb?

- A) Full house  
C) Was dirty  
E) Early morning  
B) Three women  
D) Very funny

4. Which is not correct?

- A) In February  
C) At my house  
E) Only May  
B) On 5:00 o'clock  
D) Near me

Choose the incorrect word for Question # 9  
5 to 97.

5. Sharks differ from A) other fish B) is that their skeleton are made C) of cartilage instead D) bone.
6. The A) hormone insulin controls over the B) amount C) of sugar in the blood which D) A provides energy for the body.
7. I use a bike A) both to ride B) to school C) and going to D) market. A
8. Which one of the following four options is nearest in meaning to the word capitals

## ASTOUND:

A) Shock

B) Confer

C) Condescend

D) Strengthen

## 9. SCOPE:

A) Cleans

B) Mock

C) Scrutinize

D) Stifle

## 10. WISP:

A) Tuft

B) Pack

C) Smell

D) Spry

1. Ambition is one of those is never satisfied.  
A) Ideas B) Fancies  
C) Energies D) Passions
2. The opponents were outnumbered, but still the commander refused to  
A) Quit B) Way  
C) Over D) In
3. Spot the error:  
The dean of this college is a good friend of me A  
B C D
4. Spot the error:  
There have been heavy rainfall yesterday. A  
B C D
5. Choose similar meanings: Barbarian.  
A) Uncivilized B) Civilized  
C) Cultured D) Vagabond
6. Choose opposite meaning: Uncertain.  
A) Vague B) Doubtful  
C) Sure D) Clownish
7. Choose the opposite meaning: Quote  
A) Cite B) Analyze  
C) Saying D) Feel
8. He was very polite me.  
A) To B) With  
C) On D) For

Read the passage to answer the question:

Doctors are people who examine other people in their clinics. When patients visit them, the doctors follow a certain procedure. They take the pulse, thumb the test and listen to the heart beats through the stethoscope, and perhaps a miniature rubber tyre is inflated around the patient's arm and is blown up to check what is called blood pressure.

9. Who are the other people whom doctors examine?

- A) Men B) Women  
C) Patients D) Children

10. Patients visit doctors means:

- A) address them  
B) visit their homes  
C) treat them as patients  
D) the doctor calls on them

### PHYSICS

Two masses of 7 kg and 3kg respectively are hanging on a frictionless pulley. Calculate the acceleration due to gravity.

- A)  $1 \text{ ms}^{-2}$   
B)  $2 \text{ ms}^{-2}$   
C)  $3 \text{ ms}^{-2}$   
D)  $4 \text{ ms}^{-2}$

2. A body is moving upward with a velocity of 500m/sec. What will be the height?  
A) 12.7 km B) 13.7 km  
C) 15 km D) 16 km
3. A ball is thrown vertically upward with a velocity of 98 m/s. How high does the ball rise?  $g = 9.8 \text{ m/sec}^2$ .  
A) 360m B) 380m  
C) 490m D) 510m
4. Which quantity can be described in terms of only two base quantities?  
A) Current B) Charge  
C) Force D) Temperature
5. If in a parallel plate capacitor, we insert a metal sheet of half the thickness as compared with the spacing between the plates of the capacitor, the capacitance becomes:  
A)  $C/4$  B)  $C/2$   
C)  $2C$  D)  $4C$
6. At given t taken a body at rest which then moves with an acceleration, after 3sec, its momentum:  
A) 2 B) 3  
C) 1 D) 0.5
7. Which pair includes a scalar quantity and a vector quantity?  
A) Kinetic energy and momentum  
B) Potential energy and work  
C) Velocity and acceleration  
D) Weight and force
8. A stone is whirled, it experiences an inward force by string which is:  
A) Centrifugal force  
B) Proportional to square of speed  
C) Tangent  
D) Inverse of square of speed
9. One volt can be defined as:  
A) One joule work done in moving unit positive charge from one point to another  
B) Ratio of energy dissipated at one and other point  
C) Ratio of power dissipated at one and other point  
D) All of these
10. Work done by a constant source of 1KW power that is 1000 J per sec in one. hour is:  
A) KWh B) Watt  
C) Watt hour D) M Watt
11. The focal length ( $f = 10\text{cm}$ ). At what distance object should be placed to get image twice size of object?  
A) 15cm B) 20cm



- C) 25cm D) 30cm
12. In diffraction experiment, something done by moving apparently away from screen such that plane wavelengths obtained. This describes:  
A) Michelson diffraction  
B) Newton's diffraction  
C) Einstein's diffraction  
D) None of the above
13. Which of the following electromagnetic phenomenon wave nature is not enough explain?  
A) Photoelectric effect B) Interference  
C) Diffraction D) Polarization
14. A freely falling objects is an example of:  
A) Newton's first law B) Newton's 2nd law  
C) Archimedes principle D) All of these
15. If resulting intensity is greater than individual intensities of two waves then it is:  
A) Constructive interference  
B) Destructive interference  
C) Instinctive interference  
D) None
16. For 0 to 10 °C rise in temperature, volume of water will:  
A) increases  
B) Decreases  
C) First increases then decreases  
D) No effect
17. In an organ pipe, if a person blows it fast then what change will occurs in sound waves? (i) speed (ii) Amplitude (iii) Frequency (iv) Intensity  
A) I and II B) I only  
C) III only D) I, II, III and IV
18. A gas has a volume of 500ml at 760 torr. What will be the pressure if the volume is reduced to 300ml?  
A) 1266.67 torr B) 1366.67 torr  
C) 1566 torr D) 1866 torr
19. A student calculates the result of an experiment as 1.65, 1.72 and 1.89. But when he checks its answer comes out to be 2.35. What would it be called?  
A) Precision and no accuracy  
B) No precision but accurate  
C) No accuracy but precise  
D) Accurate and precise
20. Heating a gas at constant volume will cause:  
A) Increase in temperature  
B) Increase in temperature and internal energy  
C) Increase in internal energy  
D) Decrease in internal energy and increase in temperature
21. Light passes through two parallel slits and falls on a screen. The pattern produced is due to interference and:  
A) Reflection B) Refraction  
C) Polarization D) Diffraction
22. A racing car accelerates uniformly through three gears, changes with the following average speed 20 for 25, 40 for 2.05, 60 for 6 sec what is the overall average speed of the car?  
A) 12 m/sec B) 13.3 m/sec  
C) 40 m/sec D) 48 m/sec  
E) 37
23. Radiation is the chief method of energy transfer  
A) From the sun to an earth satellite  
B) From a gas flame to water in a tea Kettle  
C) From a soldering iron to metals being soldered  
D) From water to an ice cube floating on it  
E) From materials to surrounding air
24. A Rocket moves according to the principle of conservation of:  
A) Mass B) Force  
C) Energy D) Momentum
25. The property of bending of light around obstacles is called:  
A) Reflection B) Refraction  
C) Diffraction D) Interference
26. The drag force acting on a sphere of radius  $r$  moving slowly through a viscous fluid is proportional to:  
A)  $r^2$  B)  $r$   
C)  $1/r^2$  D)  $1/r$
27. Weber is a unit of:  
A) Magnetic force  
B) Magnetic flux  
C) Electric flux  
D) Magnetic induction
28. To observe the position of micro particle with greatest accuracy, light of:  
A) Long wavelength  
B) Short wavelength  
C) Low intensity  
D) High intensity
29. The unit of electromotive force is:  
A) Newton B) Newton Coulomb C) Watt  
D) Volt
30. The cross products of two parallel vectors is:  
A) A null vector  
B) Unit vector  
C) Zero  
D) The products of magnitudes

## BIOLOGY

1. The difference between the rough endoplasmic reticulum and smooth endoplasmic reticulum is due to the presence of:  
A) Mesosomes B) Ribosomes

Which of the following is correctly paired with its function?

- A) Mitochondria store lipids  
B) Golgi bodies formation of polysaccharides  
C) Lysosomes, is a single celled organelle for storage  
D) Ribosome work more efficiently in acidic medium

Which of the following hormones of endocrine system is not paired correctly?

- A) Anterior pituitary gland = LH  
B) Adrenal cortex = Glucocorticoids  
C) Anterior pituitary gland = FSH  
D) Adrenal medulla = Epinephrine  
E) Parathyroid = Parathormone

Which belongs to the phylum:

- A) Annelida  
B) Arthropoda  
C) Nematoda  
D) Echinodermata

The process of formation of RNA from DNA is called:

- A) Translation  
B) Transcription  
C) Mutation  
D) Replication

Loss of water through Hydathodes is called:

- A) Guttation  
B) Transpiration  
C) Photosynthesis  
D) Respiration

Which of the following is the part of pectoral girdle?

- A) Scapula  
B) Pubis  
C) Sternum  
D) Glenoid cavity

Antibodies are not present in:

- A) Blood  
B) Lymph  
C) Saliva  
D) Saliva

Two or more populations of different species living and interacting in same area are called:

- A) Group  
B) Community  
C) Habitat  
D) Population

Apple trees, oaks and palm trees are:

- A) Sperms  
B) Gymnosperms  
C) Angiosperms  
D) Bryophytes

Measles causes:

- A) Contraction  
B) Itching of eyes  
C) Swelling and constriction of pupil  
D) Sneezing

A man is color blind and marry with normal woman what will be correct?

- A) 50% females will be carrier and 100% males affected  
B) Normal males 100% affected females  
C) 50% males affected 50% females carriers  
D) 50% females normal, 50% males affected

and secreted by

NUMS and National MDCAT by Ali Sudais

- A) Acid Intestine  
B) Enzyme stomach  
C) Protein-Jejunum  
D) Secretion-pancreas

14. Which of the following is the correct outline of the main events in photosynthesis:

- A) Oxygen reacts with carbohydrates to produce water and carbon dioxide in the presence of light  
B) Light splits water and the resulting hydroxyl group combines with a compound which has incorporated carbon dioxide  
C) Light splits water and the resulting carbon then combines with a oxygen and hydrogen obtained from water  
D) Carbon dioxide combines with acceptor compound and this is reduced by hydrogen split from water by light

15. Progesterone causes:

- A) Makes uterus ready for implantation  
B) Release FSH  
C) Produce follicle  
D) Inhibits LH

16. Which one is not a respiratory organ of arthropods?

- A) Gills  
B) Book lung  
C) Trachea  
D) Antenna

17. What is that response in which organism does not show any differences on repeated UN-harmful effect?

- A) Imprint  
B) Habituation  
C) Instinct learning  
D) Learning

18. Which one is the correct for the theory of Darwin?

- (i) Struggle for existence  
(ii) Survival  
(iii) Over production  
(iv) Evolution

- A) I, II, III, IV  
B) III, I, IV  
C) IV, III, II, I  
D) II, I, III, IV

19. Which one is not an STD?

- A) Gonorrhea  
B) Syphilis  
C) AIDS  
D) Meningitis

20. The common disease caused by lack of vitamin C is called:

- A) Diabetes mellitus  
B) Typhoid  
C) Scurvy  
D) Malaria  
E) None of the above

21. The cells transmit impulses from the:

- A) Effector organ to the spinal cord  
B) Receptor cells to the effector organ  
C) Receptor cells to the spinal cord cells  
D) Spinal cord to the effector organ  
E) Spinal cord to the receptor cell

22. How many bones are present in the wrist?

- A) Four bones      B) Six bones  
C) Eight bones      D) Ten bones  
E) Many bones
23. Molds and yeast are classified as:  
A) Rhodophytes      B) Bryophytes  
C) Fungi      D) Collates  
E) Flagellates
24. A gamete without any sex chromosome termed as:  
A) Nullo gamete      B) Neo-gamete  
C) Hemizygous      D) None of these
25. Phospho di-ester bond is present in:  
A) ATP      B) GTP  
C) NAD      D) All
26. Pick the opposite working pair:  
A) RBC and platelet  
B) Neutrophils and monocytes  
C) Basophils and eosinophils  
D) Lymphocytes and monocytes
27. Protein found in highest concentration in blood is:  
A) Albumin      B) Globulin  
C) Prothrombin      D) Fibrinogen
28. A phage virus is a virus that infects:  
A) Other viruses      B) Protozoa  
C) Bacteria      D) Algae
29. Which one of the following does not change when the muscle contracts?  
A) A-band      B) I-band  
C) H-zone      D) Length of muscles
30. The swelling of structure due to absorption of water is called:  
A) Guttation      B) Plasmolysis  
C) Deplasmolysis      D) Imbibition

## CHEMISTRY

1. The pH of 1 molar KOH is:  
A) 8      B) 7  
C) 14      D) 1
2. The electronic configuration  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^7$  depicts an atom of the element.  
A) Br      B) Co  
C) Ga      D) Mg  
E) Cd
3. Oxidation of secondary Alcohol gives:  
A) Aldehyde      B) Ketone  
C) Ethene      D) Mineral acid
4. If two atoms of different elements having different electro negativities combine such a way that they share electrons then the bond between them is:  
A) Polar covalent      B) Non polar covalent  
C) Hydrogen bond      D) Ionic bond
5. Shiny, electrically non conducting and brittle these characteristics depicts that under consideration is:  
A) Halogen      B) Transition metal  
C) Alkali metals      D) Alkaline earth metals
6. Which of the following is most highly reactive metal?  
A) Na      B) Cl  
C) Mg      D) Fe
7. There is a chemical under consideration. We do not know if it is HCl or H<sub>2</sub>SO<sub>4</sub>. Which of the following compounds will react with the chemical under consideration to produce a precipitate and hence confirming the fact that the chemical is H<sub>2</sub>SO<sub>4</sub>.  
A) LiNO<sub>3</sub>      B) Ba(NO<sub>3</sub>)<sub>2</sub>  
C) AgNO<sub>3</sub>      D) NaCl
8. Give the IUPAC name of  
 $\text{CH}_3 - \underset{\text{C}_6\text{H}_5}{\text{CH}} - \text{CH}_2 - \text{CH}_3$   
A) Neobutane      B) Hexabutane  
C) 2-phenylbutane      D) 2-hexabutane
9. How many electrons are in  $\text{Cl}^{37}$  with charge minus 1?  
A) 18      B) 19  
C) 20      D) 21
10. A gaseous organic compound C, was burnt in an excess of oxygen. If C organic compound having 0.112 dm<sup>3</sup> volume at S.T.P, produced 0.28g of carbon dioxide. How many carbon atoms are there in one molecule?  
A) 1      B) 2  
C) 3      D) 4  
E) 8
11. In neutralization:  
A) The base is neutralized  
B) The acid is neutralized  
C) Salt is formed  
D) All of above
12.  $\alpha$ -rays (Alpha) are:  
A) Fast moving electrons  
B) Protons  
C) Neutrons  
D) Positively charged helium nuclei
13. Which orbital has lowest energy?  
A) 3d      B) 4s  
C) 3p      D) 4f  
E) 5f
14. Which one of the following one has largest ionic radius?  
A)  $\text{Pb}^{2+}$       B)  $\text{Cl}^{-1}$   
C)  $\text{K}^{+}$       D)  $\text{Na}^{+}$
15. Which of the following has greatest energy reaction?  
A) Transition state      B) Reactants  
C) Products      D) None

16. Coinage metals are:  
 A) Ni, Pd, Pt  
 C) Au, Ag, Cu  
 B) Cu, Ag, Au  
 D) Fe, Si, Sn
17. Orbitals of same energy are called as orbitals.  
 A) Atomic  
 B) Molecular  
 C) Degenerate  
 D) All
18. Which of the following does not form alcohol with Grignard reagent?  
 A)  $\text{HCHO}$   
 B)  $\text{CH}_3\text{CHO}$   
 C)  $\text{CH}_3\text{COCH}_3$   
 D)  $\text{CO}_2$
19. In gas and liquid temperature is measure of:  
 A) Vibrational kinetic energy  
 B) Translational kinetic energy  
 C) Rotational kinetic energy  
 D) Potential energy
20. Which one of the following has lowest critical temperature?  
 A)  $\text{CO}_2$   
 B) Ar  
 C)  $\text{N}_2$   
 D)  $\text{O}_2$
21. Purity of solid substances can be checked by:  
 A) Shape  
 B) Melting point  
 C) Density  
 D) Colour
22. Boiling point of water depends upon:  
 A) Amount of water  
 B) Surface area  
 C) Vapour pressure  
 D) Atmospheric Pressure
23. Bond present in diamond is:  
 A) Ionic  
 B) Molecular

- C) Covalent  
 D) Metallic
24. Aluminum does not corrode due to the formation of:  
 A)  $\text{O}_2$ -layer  
 B)  $\text{H}_2\text{O}$  layer  
 C)  $\text{H}_2\text{O}$  layer  
 D)  $\text{Al}_2\text{O}_3$  layer
25.  $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$  is the formula of:  
 A) Feldspar  
 B) Corundum  
 C) Clay  
 D) Gypsum
26. Dissociation of solute does not depend on:  
 A) Size of solvent  
 B) Temperature  
 C) Nature of solute  
 D) Concentration of solute
27. Shape of the orbital is given by:  
 A) Principle Quantum number  
 B) Azimuthal Quantum number  
 C) Magnetic Quantum number  
 D) Spin Quantum number
28. Electrical energy is converted into chemical energy by:  
 A) Electrical cell  
 B) Electrolytic cell  
 C) Galvanic cell  
 D) Daniel cell
29. When strong acid is added to the buffer solution, it results in the formation of:  
 A) Strong Acid  
 B) Weak Acid  
 C) Weak Acid  
 D) Weak base
30. Vapour pressure of ethanol is:  
 A) Greater than water  
 B) Lesser than water  
 C) Equal to water  
 D) None RAN



1. E: Hint: 9.6 s
2. A: Hint: 1.67 m
3. B: Hint: Photoelectric effect
4. C: Hint: I and II
5. A: Hint: 1.0eV
6. C: Hint:  $6.16 \times 10^{-19}$   $1.673 \times 10^{-27}$  kg
7. E: Hint: Both A and B
8. C: Hint: Half
9. B: Hint: High low
10. A: Hint: Fission reaction
11. D: Hint: Both A and B
12. C: Hint:  $6.21 \times 10^{-21}$  J
13. C: Hint: 10
14. D: Hint: -2.5 N
15. D: Solution: increases increases
16. A: Solution: Diffraction
17. B: Solution: 590 nm 18
18. D: Solution: Both A and B
19. A: Solution: Longitudinal waves
20. A: Solution: 170 Hz, 140 Hz, 510 Hz
21. B: Solution: destructive interference
22. E: Hint: 88.46 Mpa
23. E: Hint: I, II and III
24. B: Hint: 50% 25
25. B: Hint: Irreversible process
26. E: Hint: 88.46 Mpa
27. A: Hint: 0.36 A
28. A: Hint:  $3.66 \times 10^{-3}$  K<sup>-1</sup>
29. B: Hint:
30. C: Hint:  $9.93 \times 10^{-2}$  m

## CHEMISTRY

1. C: Hint: Y has a lower melting point than V
2. A: Hint: The number of electrons used in bonding
3. A: Hint: Intramolecular hydrogen bonds
4. A: Hint: 24.31
5. B: Hint: 94.53 c.c
6. A: Hint: 6 K<sub>2</sub> Y/M
7. A: Hint: 333.1 mm
8. B:
9. D: Hint: 16.9%
10. D: Hint: All of the above
11. C: Hint: 3-Methyl-1 pentene
12. D: Hint: All of the above
13. B: Hint: 2, 4, 6-Tricyano phenol
14. C: Hint: CH<sub>3</sub>COCH<sub>3</sub>
15. C: Hint: IV < III < I < II
16. B: Hint: Hunsdicker reaction
17. D: Hint: NaBH<sub>4</sub> / EtOH
18. B: Hint: Magnesium oxide
19. B: Hint: Four
20. B: Hint: Polypeptides
21. C: Hint: C<sub>6</sub>(H<sub>2</sub>O)<sub>6</sub>
22. A: Hint: Solubility

23. B: Hint: Acidic
24. A: Hint:  $4 \times 10^{10}$
25. D: Hint: decreases increase
26. C: Hint:  $O \rightarrow O^{2-}$
27. A: Hint:  $T = T_2$
28. C: Hint: Violet in colour
29. B: Hint:  $[Fe(H_2O)_6]^{2+}$
30. A: Hint: 386 JK<sup>-1</sup>
31. B: Hint:  $4.8 \times 10^{-6}$  mole l<sup>-1</sup>s<sup>-1</sup>
32. C: Hint: Tosylate CN<sup>-</sup>
33. B: Hint: Trimethylamine and 3-methyl-1-butene
34. D: Hint: Positive, positive negative
35. B: Hint: They are hydrophobic and 3-methyl-1-butene

## BIOLOGY

1. A: Hint: 1
2. A: Hint: Produces bile
3. A: Hint: 5
4. D: Hint: 2 and 5
5. D: Hint: Hormones increases the permeability of the collecting
6. B: Hint: Glucose
7. C: Hint: In the proximal (first)
8. D: Hint: III and IV
9. B: Hint: Reflex actions
10. D: Hint: water 11
11. Answer B: Hint: LH
12. Answer E: Hint: Secretion of a chemical from X
13. C: Hint: Pancreas
14. B: Hint: Estrogen
15. D: Hint: Meiosis
16. Answer C: Hint: Voluntary and striated
17. Answer B: Hint: Cells of the periosteum differentiate into osteoblasts
18. A: Hint: Parathormone
19. A: Hint: Actin moves to shorten the muscle
20. Answer A: Hint: Hypothalamus
21. Answer A: Hint: A) I II III
22. Answer A: Hint: Mitochondria
23. Answer B: Hint: Aminopeptidase.....stomach
24. Answer E) : Hint: Taxonomy
25. Answer E) : Hint: Ultracentrifuge
26. Answer E) : Hint: E
27. Answer A) : Hint: Removal of bile pigments from the body
28. Answer A) : Hint: Random mating
29. Answer B) : Hint: PSRQ
30. Answer C) : Hint: Nitrogen
31. Answer D) : Hint: Mitochondrion
32. Answer E) :
33. Answer D) : Hint: II and III only



**BIOLOGY**

1. Answer C: Hint: Facilitated diffusion
2. Answer C: Hint: Glucose is degraded into two molecules
3. Answer A: Hint: Stomach
4. Answer D: Hint: Both A and C
5. Answer D: Hint: The volume of air that always remains in the lungs.
6. Answer C: Hint:  $\text{Na}^+ \text{K}^+ \text{Ca}^{+2}$  Acetylcholine  $\text{Na}^+$
7. Answer B: Hint: A water vascular system
8. Answer E: Hint: Release ammonia from organic compounds, thus returning into the soil.
9. Answer C: Hint: 1/2
10. Answer: II only
11. Answer B: Solution Calyx
12. Answer D: Hint: Barley
13. Answer C: Hint: 12-14 days
14. Answer B: Hint: Thigmotropism
15. Answer C: Hint: Fungi are non-coenocytic
16. Answer B: Hint: Phloem
17. Answer B: Hint: Green and wrinkled are both recessive characters
18. Answer A: Hint: Ovoviviparous
19. Answer C: Hint: Cnidarians
20. Answer C: Hint: 48 % A, 48% T; 52% C; 52%G
21. Answer: E: Hint: I, III, V, II, IV
22. Answer A: Hint: Glucose  $\rightarrow$  triose phosphate  $\rightarrow$  pyruvate Krebs cycle  $\rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{ATP}$
23. Answer A: Hint: Increase in wind velocity temperature humidity and light intensity
24. Answer D: Hint: Glucose is actively absorbed by the proximal tubule cells.
25. Answer B: Hint: Metaphase I
26. Answer D: Hint: Right ventricle into the right atrium
27. Answer A: Hint: Decreases blood glucose levels
28. Answer A: Hint: Immediately before and after ovulation
29. Answer B: Hint: During an outbreak, the virus is in the lytic cycle
30. Answer B: Hint: A group of organisms showing analogues bod structure

**PHYSICS**

1. Answer D: Hint: 100%
2. Answer A: Hint: Free vector
3. Answer B: Hint: 2960 meters
4. Answer C: Hint: Law of conservation of momentum
5. Answer A: Hint:  $4.0 \text{ m/sec}^2$
6. Answer D: Hint:  $20 \text{ m/sec}^2$

7. Answer A: Hint: 0.707
8. Answer C: Hint: 5000 J
9. Answer E: Hint: None of the above
10. Answer A: Hint: 1.885 sec
11. Answer D: Hint: 225 V
12. Answer B: Hint: I and III only
13. Answer B: Hint: -203
14. Answer B: Hint: Electric field
15. Answer A: Hint: -5.0
16. Answer B: Hint: Increase
17. Answer C: Hint: The induced current always flows in such a direction as to oppose the change which giving rise to it.
18. Answer A: Hint: 1.8 m/sec
19. Answer B: Hint:  $3/2 \mu\text{F}$
20. Answer B: Hint:  $R/2$
21. Answer B: Hint:  $10^{-3} \text{ W/m}^2$
22. Answer A: Hint: Have a longer wavelength
23. Answer D: Hint: 8 seconds
24. Answer C: Hint: 5 Hz
25. Answer B: Hint: 100
26. Answer B: Hint: It suffers friction
27. Answer A: Hint: 33.25
28. Answer D:  $45^\circ\text{C}$
29. Answer B: Hint: The large drop moves faster
30. Answer A: Hint: there will be a change in internal energy

**CHEMISTRY**

1. Answer C: Hint: Hydrogen iodide
2. Answer D: Hint:  $\text{C}_{10}\text{H}_2\text{O}$
3. Answer B: Hint: Oxidizing agent
4. Answer A: Hint: The first ionization energy of sodium
5. Answer B: Hint: It contains the same number of atoms as  $1/2$  mole of  $\text{C}^{12}$
6. Answer B: Hint: stay roughly the same
7. Answer A: Hint: Molecular crystals
8. Answer B: Hint: A catalyst will be used up in a reaction.
9. Answer B: Hint: the electrolysis of water
10. Answer C: Hint: Aqueous sodium hydroxide
11. Answer B: Hint: Methane
12. Answer A: Hint: Chlorine
13. Answer B: Hint:  $3.4 \times 10^{23}$
14. Answer B: Hint: Molecular mass
15. Answer D: 12
16. Answer C: Hint: Ethanol  $\text{C}_2\text{H}_5\text{OH}$
17. Answer A: Hint: Glycine
18. Answer C: Hint: When it has the general formula  $\text{C}_n\text{H}_{2n+2}$
19. Answer D: Hint: Under suitable conditions graphite can be converted into diamond.
20. Answer A: Hint: K



21. Answer C: Hint: 1 mole of  $\text{NH}_3$  at 3K and 1 atm occupies volume 22.4 liters
22. Answer B: Hint: Only  $\text{H}^+$  and  $\text{OH}^-$  ions react in every case.
23. Answer D: Hint: Lower ionization energy
24. Answer B: Hint: one sigma and two Pi bonds
25. Answer B: Hint: Bronze
26. Answer A: Hint:  $\text{NH}_3$
27. Answer B: Hint: 4
28. Answer C: Hint: Meta
29. Answer A: Hint: A NaCl
30. Answer B: Hint:  $\text{dz}^2$

### ENGLISH

1. Answer E: Hint: Hear
2. Answer A: Hint: old man
3. Answer D: Hint: very funny
4. Answer B: Hint: at 5 o'clock
5. Answer D: Hint: instead
6. Answer B: Hint: controls over the
7. Answer D: Hint: going to
8. Answer A: Hint: Shock
9. Answer C: Hint: Scrutinize
10. Answer B: Hint: Pack

2012

### PHYSICS

1. Answer D: Hint:  $4\text{ms}^{-2}$
2. Answer A: Hint: 12.7 Km
3. Answer C: Hint: 490m
4. Answer B: Hint: Charge
5. Answer C: Hint: 2c
6. Answer A: Hint: 2
7. Answer A: Hint: Kinetic energy and momentum
8. Answer A: Hint: Centrifugal force
9. Answer A: Hint: One joule work done in moving unit positive charge from one point to another
10. Answer C: Hint: Watt hour
11. Answer A: Hint: 15cm
12. Answer A: Hint: Michelson diffraction
13. Answer A: Hint: Photoelectric effect
14. Answer A: Hint: Newton's first law
15. Answer A: Hint: Constructive interference
16. Answer C: Hint: First increases then decreases
17. Answer C: Hint: III only
18. Answer A: Hint: 1266.67 torr
19. Answer A: Hint: Precision and no accuracy
20. Answer B: Hint: Increase in temperature and internal energy
21. Answer D: Hint: Diffraction
22. Answer D: Hint: 48 m/sec

23. Answer A: Hint: From the sun to an earth satellite
24. Answer D: Hint: Momentum
25. Answer C: Hint: Diffraction
26. Answer D: Hint: R
27. Answer B: Hint: Magnetic flux
28. Answer B: Hint: Short wavelength
29. Answer D: Hint: Volt
30. Answer D: Hint: Product of magnitudes

### BIOLOGY

1. Answer B: Hint: Ribosomes
2. Answer E: Hint: None
3. Answer C: Hint: Posterior pituitary gland = PSH
4. Answer C: Hint: Nematode
5. Answer B: Hint: Transcription
6. Answer A: Hint: Guttation
7. Answer D: Hint: Glenoid cavity
8. Answer C: Hint: Plasma
9. Answer B: Hint: Community
10. Answer A: Hint: Angiosperms
11. Answer A: Hint: Muscle contraction
12. Answer A: Hint: 100 % of females will be carrier and 100% males will be normal
13. Answer B: Hint: Enzyme-stomach
14. Answer E: Hint: Carbon dioxide combines with acceptor compound and this is reduced by hydrogen spit from water by light.
15. Answer A: Hint: Make uterus ready for implantation
16. Answer D: Hint: Antenna
17. Answer B: Hint: Habituation
18. Answer C: Hint: IV, III, II, I
19. Answer D: Hint: Meningitis
20. Answer C: Hint: Scurvy
21. Answer D: Hint: Spinal cord to the effector organ
22. Answer C: Hint: Eight bones
23. Answer C: Hint: Fungi
24. Answer A: Hint: Nullio gamete
25. Answer C: NAD
26. Answer C: Basophills and oesinophills
27. Answer A: Hint: Albumin
28. Answer C: Hint: Bacteria
29. Answer A: Hint: A-band
30. Answer D: Hint: Imbibition

### CHEMISTRY

1. Answer C: Hint: 14
2. Answer B: Hint: CO
3. Answer B: Hint: Ketone
4. Answer A: Hint: Polar covalent
5. Answer A: Hint: Halogen



6. Answer A: Hint: Na
7. Answer B: Hint:  $\text{Ba}(\text{NO}_3)_2$
8. Answer C: Hint: 2-phenylbutane
9. Answer A: Hint: 18
10. Answer D: Hint: 4
11. Answer D: Hint: All of these
12. Answer D: Hint: Positively charged helium nuclei
13. Answer C: Hint: 3p
14. Answer C: Hint:  $\text{K}^+$
15. Answer A: Hint: Transition state
16. Answer B: Hint: Cu, Ag, Au
17. Answer C: Hint: Degenerate
18. Answer D: Hint:  $\text{CO}_2$
19. Answer B: Hint: Transitional kinetic energy
20. Answer C: Hint:  $\text{N}_2$
21. Answer B: Hint: Melting point
22. Answer D: Hint: Atmospheric pressure
23. Answer C: Hint: Covalent
24. Answer A: Hint:  $\text{Al}_2\text{O}_3$  layer
25. Answer C: Hint: Clay
26. Answer D: Hint: Concentration of solute
27. Answer B: Hint: Azimuthal quantum number
28. Answer B: Hint: Electrolytic cell

29. Answer D: Hint: Weak base
30. Answer A: Hint: Greater than water

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### Answer Keys [2012]

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### ENGLISH

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1. Answer D: Hint: Passions
2. Answer D: Hint: IN
3. Answer D: Hint: Of me
4. Answer B: Hint: Have
5. Answer A: Hint: Uncivilized
6. Answer C: Hint: Sure
7. Answer D: Hint: Analyze
8. Answer A: Hint: To
9. Answer C: Hint: Patients
10. Answer C: They go to them as patients